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CONTENTS

Names of new genera and species in *italics.*

Africa 133
American Malacological Union 65, 144
Ammonitella yatesi allyni Chace 122
Amnicola sablensis Pilsbry 119
Ancylidae, neotropical 123
Anodontites cornea, A. nicaraguae 77
Ashmunella edithae Pilsbry & Cheatum 88
Atlantic marines .. 14, 34, 40, 73, 109, 110, 116, 121, 132, 143
Bahamas 37, 123
Bivalve larvae, killing and preserving 14
Bog lake, mollusks 19
Brazil 4, 123
Bruguière, plates 68
Busycon, subgenera *Fulguropsis* and *Sycofulgur* Marks .. 34
California, inland 122
California, marines 9, 84, 91, 105
Calliostoma (*Eutrochus*) *jujubinum adelae* Schwengel .. 119
Carpenter collection 70
Central America (see neotropical) .....
Chione (*Chionopsis*) *pinchoti* Pilsbry & Olsson 109
Chondropoma schaliei 17
Crassispira drangai Schwengel 116
Dates of Nautilus 35
Egg cases as whistles 1
Elma, subgenus *Fultonelma* Haas 133
Elma (*Fultonelma*) *bisexigua* Haas for Bulimus exiguus Mo. 134
Emery, Daniel L. 36, 61
Euglandina bailyi M. Smith 60
Eupleura caudata etterae B. B. Baker 76
Florida, inland 37, 119
Florida, marines 109, 110, 116, 121, 143
Fontigens oxybeles Pilsbry 37
Fontigens weberi Pilsbry 39
Fulguropsis Marks, subgenus of Busycon 34
Fultonelma Haas, subgenus of Elma 133
Guatemala 77, 123
Gulella, subgenus *Thaumatogulella* Haas 134
Haliotis 91
Hebetancylus providentialis Wurtz 127

Helicella caperata 141, 142
Helisoma anceps 68
Hemisinus palaeus Pilsbry, for H. (Longiverena) avus .. 69
Hiatella vs. Saxicava 29
Holospira kriegeri Drake 52
Holospira oritis Pilsbry & Cheatum 89
Holospira pityis Pilsbry & Cheatum 89
Holospira roemeri brevissima Pilsbry 56
Honduras 77, 123
Indiana 54
Infraspecific names 47, 103
Jacosta caperata or J. intersecta 141, 142
Jamaica 36, 123
Japan 1, 94
Juliidae 84
Leptodea largillierti 77
Louisiana 96
Marginella hilli M. Smith 61
Maryland 67
Maxwellia Baily (Muricidae) 11
McGill University Museums 70
Mexico 51, 60, 77, 120, 123
Mytilus californianus hermaphrodite 105
Neotropical 4, 51, 60, 77, 119, 123
New York 35, 58, 70, 102, 104
Nicaragua 77, 123
North Carolina 37, 67, 102, 142
Nylander, Olaf O. 63
Ohio 19
Oliva drangai Schwengel 117
Olivella bayeri Abbott 111
Olivella moorei Abbott 112
Oregon 58
Oriental 1, 94
Ortmann, Arnold Edward 134
Pacific marines 1, 9, 47, 60, 84, 91, 105
Pennsylvania 100
Pitaria cordata Schwengel 118
Plotia, type species 68
Polinices (*Mammilla*) *clarki* M. Smith 60
Polygyra mooreana 101
Polygyridae 6
Populations 47
Preservation 14, 90
Pseudosubulina cheatumi Pilsbry 55
Puerto Rico 17, 123
Sagda, subdivisions & type 36

Saxicava vs. Hiatella 29
Slugs, preservation 90
South America (see Neotropical) .....
Streptostyla jacobsoni Pilsbry 120
Strombus bituberculatus 143
Succinea lauta sphaerica MacMillan 94
Sycofulgur Marks, subgenus of Busycon 34
Tegula gallina 50
Tethys willcoxi 40
Tennessee 58
Texas 37, 55, 56, 87, 101
Thaumatogulella Haas, subgenus of Gulella 134
Triodopsis tennesseensis burchi Hubricht 8
Type of species 27
Urosalpinx cinereus follyensis B. B. Baker 75
Vallonia excentrica 35, 70
Vexillum (Uromitra) willcoxi coxianum Fargo 121
Virginia 6, 37,. 58, 141
Viviparus chinensis 35
Viviparus contectoides 35, 102
West Indies 17, 36, 37, 123
Woodring, Wendell P. 69
Wyoming 101

INDEX TO AUTHORS

Abbott, R. Tucker 103, 110
Bales, B. R. 143
Baily, Joshua L., Jr. 9, 91
Baker, Bernadine Barker 73
Baker, H. Burrington 17, 27, 35, 36
Beetle, Dorothy E. 101
Bushey, Clinton J. 54
Cahn, Alvin R. 1
Carriker, Melbourne R. 14
Chace, E. P. 122
Cheatum, E. P. (Pilsbry &) 87
Cleghorn, J. D. 70
Dexter, Ralph W. 19
Dodge, Henry 29, 68
Drake, Robert J. 51
Fargo, William G. 61, 121
Freas, Dorothy L. 35, 102
Haas, F. 4, 133
Harry, Harold W. 96
Heilman, Robert A. 100
Howard, Arthur Day 84
Hubricht, Leslie 6, 35, 67, 90, 102
Jackson, Ralph W. 67
Jacobson, Morris K. 70, 104
Johnson, Richard I. 77
Lee, C. Bruce 58
MacMillan, Gordon K. 94
Marks, E. Sydney 34
McLellan, Jack H. 101
Olsson, A. A. (Pilsbry &) 109
Pilsbry, H. A. 37, 55, 56, 68, 68, 69, 119
Pilsbry, H. A., & E. P. Cheatum 87
Pilsbry, H. A., & A. A. Olsson 109
Raymond, Percy E. 63
Saunders, D. 142
Schalie, Henry van der 134
Schwengel, Jeanne S. 116
Smith, Maxwell 60
Stohler, R. 47

Teskey, Margaret C. 65
Webb, Glenn R. 143
Weingartner, Mathilde P. 132
Wood, John Thornton 141
Wurtz, Charles B. 123
Young, R. T. 105
Zinn, Donald J. 40

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CONCHOLOGICAL MONUMENTS IN JAPAN

By ALVIN R. CAHN

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As a rule, monuments and memorials are erected to the memory of important people or famous events. While it is readily granted that conchologists are important people, I must admit that I personally know of no monument erected to a conchologist *per se*—other than the headstone that marks his last resting place. This is unfortunate. It seems to indicate a lack of public appreciation of lifetimes of devoted study, as well as of the subject matter itself. I was, therefore, interested to find in Japan three fine examples of what I shall call "conchological monuments," though they are not memorials erected to the memory of any conchologist. On the contrary, they were erected to the memory of the conchs rather than the conchologists. Since these memorials are unusual, if not unique, I wish to call them to the attention of occidental conchologists as being something, to say the least, refreshingly different.

If the traveller between Tokyo and Yokohama looks out of the right hand window of the train just at the right moment after leaving Tokyo Central Station, he will see a wooded hill rising slightly above the great stone wall that bounds the railroad right of way through the section of Tokyo known as Omori. Atop this embankment, in the middle of the wooded area and facing the railroad, is a stone monument. If he alights at Omori and backtracks to inspect this monument, he will find that it consists of a large horizontal granite tablet framed in a border of rough-hewed stones. Inserted in the middle of the upper border of this frame is a small tablet bearing an English inscription, and above this a large stone urn (Plate 1, fig. 1). The inscription on the small tablet reads: "The Site of the

Omori Shell Mound Discovered by Professor Edward S. Morse." The large inscription in Japanese characters reads: "Omori Shell Mound." Below this is inscribed: "Dedicated May 26, 1929" and a list of the nine donors of the memorial.

When Dr. Morse arrived in Yokohama and took the train for Tokyo, he wasted no time in starting his scientific researches, for he, too, looked out of the train window—and discovered what came to be called the Omori Shell Mound. He returned later to excavate on this site and published his results in 1879 as Volume 1, Number 1, of the Journal of Science (Rikakaisui Dai Ichitsu) of Tokyo University, under the title "The Shell Mounds of Omori" (Omori kaikyo kobutsuhen). It is printed in Japanese, having been translated by three of Dr. Morse's students: M. Sasaki, I. Ijima, and T. Iwakawa. At a later date Dr. Sasaki was to become the Japanese authority on cephalopods and Dr. Iwakawa the foremost Japanese conchologist. In the 73 pages of text and 18 plates, the mound is described and 43 species of mollusks and a multitude of pottery fragments found therein are listed and discussed. The mound was originally 89 meters long and 4 meters high. All the mollusca described, except *Anadara granosa*, (*A. bisenensis?*) are still found living in Tokyo Bay. So here we have a monument to an ancient kitchen midden.

A second probably unique conchological memorial was erected in 1898 and still stands in a conspicuous spot at Kutsatsu Machi just outside of Hiroshima City. This fine granite obelisk (Plate 1, fig. 2) bears the inscription: "Memorial Tablet for Oyster Culture of Hiroshima" and is dedicated to the oysters that founded and built the industry for which the area has long been famous. On the left side of the monument is inscribed the following: "The place of Saeki Gun, Hiroshima Prefecture, has long been famous for oyster culture. Along the coast the oyster grounds extend for 18 miles and cover 139 cho (390 acres). The production has amounted to 2,000,000 kan (8,000 tons). These facts are due not only to the suitable ground but also to human effort."

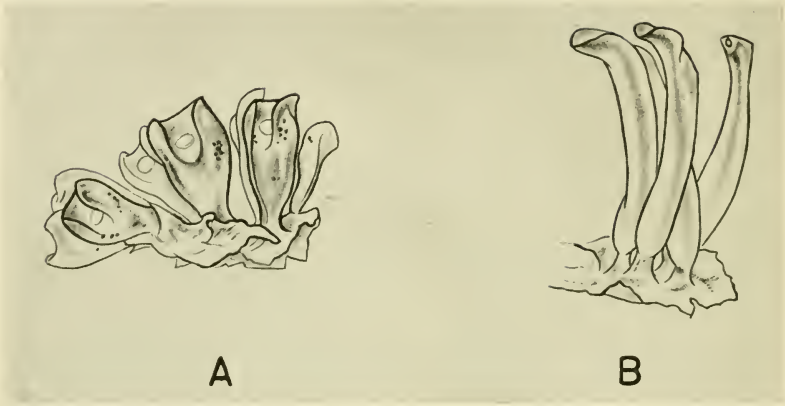
Each year the oyster fishermen of Hiroshima Prefecture gather at the monument in late April or May and hold solemn

Fig. 1

Fig. 2

Fig. 3

Conchological Monuments in Japan



Egg cases of: A, *Hemifusus ternatanus*. B, *Rapana thomasiana*. From Kyushu, Japan.

ceremony according to the Buddhist rites for the repose of the oysters' souls.

What is probably the most curious conchological monument in the world is in Tokyo. It is typically Japanese in concept and there is, naturally, a story behind it.

One of the common amusements of the women and children of Japan is blowing tiny whistles made from the egg-cases of various marine gastropods. This whistle-blowing is a custom dating from the Genroku era (1688–1704) and is common among Geisha girls and women workers in mills and factories. It is as prevalent as gum-chewing in America and in fact the little whistles are sometimes called "musical chewing gum."

In the making of these whistles, the egg-cases of five species of marine gastropods are used. These are gathered wild or may be cultivated by confining the adult animals in bamboo enclosures so that they lay their eggs on rocks placed for that purpose. The species are listed as follows in the order of their whistle importance:

1. *Hemifusus ternatanus.* (Japanese: Umi-hoozuki or sea whistle.) The larvae are removed fresh and the case dried and stained red, yellow, or green. These are considered the best whistles and the current price is comparatively very high: 1 egg-case costs 5 yen, or roughly two cents. (See fig. A.)

2. *Rapana thomasiana.* (Japanese: Naginata-hoozuki or curved sword whistle, because of the shape of the egg-case.) The cases are dipped in concentrated saltwater to kill the larvae and are then preserved in salt. Egg-cases (see fig. B) of this and the following species are very cheap, costing 500 yen per kan (four pounds).

3. *Fusinus perplexus.* (Japanese: Sakasa or Gunbai-hoozuki: inverted or war-fan whistle; "inverted" because the whistle-hole is made in the bottom of the case, and "war-fan" because the case is shaped like the fan carried by the referee in a sumo match.) Treated as *Rapana.*

4. *Cancellaria spengleriana.* (Japanese: Chanchan-hoozuki or pig-tail whistle, because of the long, slender stalk.) Treated as *Hemifusus.*

5. *Kelletia lischkei.* (Japanese: Manju-hoozuki or Sake-bottle whistle.) Not common.

As a result of this whistling custom, literally millions of egg-cases are gathered and many millions of larval gastropods destroyed to produce whistles. Now it so happened that several famous egg-case-whistle sellers in Tokyo suffered accidental death, and one by one their shops went into bankruptcy. The remaining dealers became very uneasy and fearful of their futures, believing that these sudden deaths must be in retribution for the child (veliger!) murders of so very many snails. In mute gratitude, therefore, for the sacrifice of so many embyronic lives given to establish the basis of their fortunes, 41 egg-case-whistle dealers in Tokyo in 1941 erected a memorial to the dead baby gastropods. The monument is a simple granite slab bearing on one side the legend: "Memorial Monument to Sea-shell Egg Cases" (Plate 1, fig. 3), and on the reverse side the names of the 41 dealer-donors. The monument stands in the cemetery of the war-destroyed Koshoji Temple, 16 Fukuromachi, Ushigome, Tokyo, where it is crowded in among hundreds of graves which mark the resting places of local ancestors.

Probably nowhere else in the world is there a cemetery grave and memorial monument to departed embryonic snails!

SOME LAND AND FRESH-WATER MOLLUSKS FROM PARÁ STATE, BRAZIL

By F. HAAS

On two earlier occasions (Haas, 1949,a,b), I have reported on the shells collected in Amazonia by Dr. Harold Sioli of Belém, Pará, Brazil. This paper deals with a third shipment received from the same indefatiguable and successful collector; the specimens in this lot were collected in the region of the Tapajóz river, and especially in the region of the Cuparí, a tributary. The following species are represented in this shipment:

Strophocheilus (*Megalobulimus*) *oblongus* Müller.—Caxias on Rio Cuparí; Paricatuba on the west bank of the lower Tapajóz river, specimens collected alive on one of the small islands of black soil (tena preta), pH 6.8, within the acid Amazonian

Tertiary region with a pH of only 4.5–5.0. As is noteworthy, the *oblongus*-form here mentioned is not the *S. oblongus conicus* Bequaert known from northeastern Brazil and represented, in one of the earlier shipments from Dr. Sioli, from near Obidos, Pará, Brazil.

Corona regina Férussac.—Bank of Rio Cuparé at Caxias. This seems to be one of the few exact localities from which this species has become known.

Drymaeus (*Leiostracus*) *vittatus* Spix.—Mouth of Rio Cuparí into the Rio Tapajóz. This species has apparently not been recorded before from a locality outside the states of Bahia and Pernambuco.

Gyraulus (*Drepanotrema*) *anatinum* Orbigny.—Lake Curuçá of the Cuparí River.

Aplexa (*Stenophysa*) *rivalis* Maton and Rackett.—Lake Curuçá of the Cuparí River.

Doryssa transversa macapa Moricand.—Rio Cuparí at Flechal.

Potamopyrgus (*Aroapyrgus*) *latus* Haas.—Mouth of Ingatuba Creek into the Cuparí River; Rio Cuparí at Caixas; Lake Curuçá of Rio Cuparí.

Ampullarius (*Ampullarius*) *lineatus* Spix.—Rio Cuparí at Caxias; Rio Cuparí at Galego; Lake Curuçá of Rio Cuparí.

Ampullarius (*Limnopomus*) *nubilus* Reeve.—Rio Cuparí below Flechal; source at bank of Rio Cuparí below Pinima; mouth of Caxias Creek into Rio Cuparí. This is the second report of this species generally believed to be exclusively Andean, from the lowlands of the lower Amazon (see Haas, 1949a, p. 153).

Anodontites (*Lamproscapha*) *ensiformis* Spix.—A young but unmistakable specimen of this species from Lake Curuçá of the Cuparí river; this seems to be the first record from an exact locality in the region of the lower Amazon. (See Haas, 1945, p. 15.)

Leila esula Orbigny.—Also from the Lake Curuçá of the Cuparí river and also one of the first, if not the first, record of this species from a well defined locality in Lower Amazonia.

Castalia lateriquadrata Sowerby.—Rio Cuparí at Galegos; Lake Curuçá of the Rio Cuparí; lower Cuparí River.

Triplodon (*Triquetrana*) *jamauchimiensis* F. Baker.—Rio Cuparí below Flechal; Rio Cuparí at Pedra Branca; Rio Cuparí at Galego.

References

Haas, F., 1945. Some Remarkable Shells of a South American Fresh-water Mussel. Fieldianna, Zoology, 31, pp. 15–30, fig. 3.
—— 1949a. Land- und Süsswassermollusken aus dem Amazonas-Gebiet. Arch. Moll., 78, pp. 149–156, pl. 7.
—— 1949b. On Fresh-Water Mollusks from the Amazonian Region. An. Biol. Mex., 20, pp. 301–314, 6 figs.

THE POLYGYRIDAE OF PITTSYLVANIA COUNTY, VIRGINIA

By LESLIE HUBRICHT

Pittsylvania County is the largest county in Virginia, having an area of 1,012 square miles. The elevation varies from 400, to 2,000 ft. on Smith Mountain, but having a general average of between 600 and 800 ft. The underlying rocks are of granite, gneiss, and schist, except the White Oak Mountain Ridge, which runs from the southwest corner to the northeast corner of the county, and is composed of arkosic sandstone and shale of Triassic age. It is a part of the Piedmont physiographic province.

Dr. H. A. Pilsbry, in his Land Mollusca of North America, records only one species from Pittsylvania County, and the adjoining counties fare no better. Actually, the land snail fauna is unusually rich, at least seventy-five species having been found in one year of sparetime collecting. This fauna has been derived from four sources, other than the generally distributed species of eastern United States.

The eastern two-thirds of the county is a part of the Outer Piedmont. It is gently rolling land without prominent elevations, except where the White Oak Mountain Ridge protrudes into it. A characteristic species of this region is the small form of *Triodopsis tridentata juxtidens* (Pils.).

The western third of the county is a part of the Inner Piedmont. It is a little more hilly than the Outer Piedmont and

contains occasional isolated low mountains. Its most characteristic species is *Triodopsis tennesseensis burchi.*

A number of species have followed the Dan River valley down from the Blue Ridge. There are no Polygyridae which are found exclusively in this area. *Mesomphix rugeli* (W. G. B.) is a typical species.

The Roanoke river valley has provided a path from the Great Valley, through the Blue Ridge, which many species have followed. A typical example is *Stenotrema stenotremum* (Say).

Because of uncertainties as to the identity of some of the species, particularly in the Philomycidae and Zonitidae, only the Polygyridae will be discussed at this time. The other families will be treated later when they are better understood.

Polygyra pustuloides (Bland). This species has been found at two localities: At the bottom of a ravine on the north side of White Oak Mountain, north of Spring Garden; and along Cascade Creek, 2 miles south of West Fork.

Stenotrema barbatum (Clapp). A common species in the flood-plains of the Dan and Roanoke Rivers.

Stenotrema stenotremum (Say). Common along the Roanoke River bluffs from Smith Mountain to Altavista.

Stenotrema hirsutum (Say). Abundant over the entire county on dry oak ridges, preferring a southern exposure.

Stenotrema fraternum (Say). Common in the hills above the Dan and Roanoke Rivers.

Mesodon thyroidus (Say). Generally distributed over the county, but commonest in the flood-plains of the Dan and Roanoke Rivers.

Mesodon mitchellianus downieanus (Bland). Common in the flood-plain of the Roanoke River from Smith Mountain to Altavista. In the headwaters of the Roanoke River the shells are large, running between 14 and 16 mm. in diameter, and are indistinguishable from the northern *M. mitchellianus* (Lea) Down the river they become smaller, running between 12 and 13 mm. in Pittsylvania County, and agree with *M. downieanus* of Tennessee. I believe that *M. downieanus* is only a small southern race of *M. mitchellianus.*

Mesodon appressus form *sculptior* Chadwick. Common on the cliffs along the Roanoke and Dan Rivers. The absence of

M. appressus in the Blue Ridge suggests that this species came down the Roanoke River, from the Great Valley, to the mouth of the Dan, thence up the Dan into Pittsylvania County.

Mesodon appressus form *laevior* Pilsbry. Judging by the samplings which I have made, this form must occur abundantly in every backyard in Danville. It does not occur outside the city, and is probably introduced.

Triodopsis tridentata juxtidens (Pilsbry). There are two distinct forms of this species here. The small form, running between 11 and 13 mm. in diameter, is common in upland oak woods in the Outer Piedmont. It is the common waste ground snail in Gretna, Chatham, and Dry Fork, but is not found in Danville. The large form, running between 14 and 18 mm. in diameter, is of Blue Ridge stock which has come down the Dan and Roanoke Rivers and is abundant on the bluffs along these rivers.

Triodopsis tennesseensis (Walker). I have collected this form in several places in southwestern Virginia in company with *T. tridentata* (Say) and it is always readily separable, and I believe it to be a distinct species. In Pittsylvania County it is found only in the Smith Mountain Gorge.

TRIODOPSIS TENNESSEENSIS BURCHI, **new subspecies.**

Differs from *T. tennesseensis* in being much smaller, with a more glossy surface. The lip teeth are very small or wanting. It ranges in diameter from 7.5 to 13 mm.

Height 5.5 mm., diameter 10.9 mm., 4.8 whorls. Holotype.
Height 6.7 mm., diameter 12.5 mm., 5 whorls. Paratype.
Height 4.1 mm., diameter 7.6 mm., 4.5 whorls. Callands.

Type locality: along U. S. 58, 3 miles west of Danville. Holotype and paratypes A.N.S.P. no. 186178, other paratypes A8422 in the collection of the author.

This is a common snail in the Inner Piedmont, ranging from the western third of Pittsylvania County to the Blue Ridge.

It is named in honor of Dr. Paul R. Burch of Radford College, Radford, Virginia.

Triodopsis fallax (Say). Common along roadsides and in clearings, except in the southwestern part of the county.

Triodopsis vannostrandi alabamensis (Pilsbry). Found only

in the southwestern part of the county. Along the River Road in Danville, where this species meets *T. fallax* it hybridizes with it.

Triodopsis denotata (Fér.). Found only in the Smith Mountain Gorge.

Triodopsis albolabris (Say). Common over the county. Piedmont stock averages 25 to 26 mm. in diameter. Blue Ridge stock in the valleys of the Dan and Roanoke Rivers averages somewhat larger.

Allogona profunda (Say). Found only along the Roanoke River in the Smith Mountain Gorge.

MAXWELLIA, GENUS NOVUM OF MURICIDAE

By JOSHUA L. BAILY, JR.

After a diligent search through all the literature available to him, this writer has been driven rather reluctantly to the conclusion that no generic name exists which can reasonably be applied to that group of species of which *Murex gemma* Sowerby [1] is the best known example.

The name *Muricidea* was proposed by Swainson [2] for this group, and it has been widely used and is universally understood, but unfortunately it was disqualified by Swainson (1840, p. 65) [2] himself, who in a moment of mental aberration designated *Murex magellanicus* Gmelin [3] as type. According to Tryon,[4] this name is a synonym of *Murex geversianus* Pallas [5] which is the type of *Trophon* Montfort,[6] so that the effect of Swainson's designation is to make *Muricidea* a synonym of *Trophon*.

Dall [7] has resurrected the name *Triremis* (Bayle) Fischer [8] for this group, but this course is open to objection on several

[1] Thes. Conch., *Murex*, p. 32, pl. 22, f. 214, 1879.
[2] Treat. Malac., p. 296, 1840.
[3] Syst. Nat., 13th edit., p. 3548, 1790.
[4] Man. Conch., ser. 1, v. 2, p. 242, 1880.
[5] Spicil. Zoöl., pl. 3, f. 1, 1769.
[6] Conch. Syst., v. 2, p. 482, 1810.
[7] Bull. U. S. N. M. 112, p. 106, 1921.
[8] Man. de Conchyl., v. 1, p. 641, 1884.

grounds. First the type of *Triremis* is (by monotypy) *Murex gambiensis* Reeve.[9] The figure by Reeve is of a shell with ornate varices, fringed with hooks and frills, which differs widely from the smooth shell of *Murex gemma*. Second, *Murex gambiensis* is also the type of the genus *Purpurellus* Jousseaume [10] which has four years priority over *Triremis,* so that the latter falls as an identical synonym of *Purpurellus*. And third, Dall included the species *Murex festivus* Hinds [11] in *Triremis,* which appears to be a somewhat arbitrary procedure, for even if the soft parts of *Murex gemma* and *Murex festivus* could be shown to be identical there is sufficient difference not only in the shells but also in the opercula to justify the segregation of these species in separate genera. Neither one, however, could very logically be considered congeneric with the type of *Purpurellus*.

Grant and Gale [12] have followed Dall in uniting *Murex gemma* and *Murex festivus* in a single genus, but they use the name *Jaton* Pusch [13] into the synonymy of which they throw *Jatova* Jousseaume (1880, p. 335) [10] on the ground that the respective generic types are identical. These are *Murex decussatus* Gmelin (1790, p. 3527) [3] and Le Jatou, Adanson.[14] Pusch's alteration of the spelling of Adanson's name appears to be due to the inability of his proof reader to decipher his chirography. Jousseaume's rendition constitutes a much more satisfactory Latinization of Adanson's vernacular, but we must accord priority to Pusch and accept his orthography as men take their wives, for better or for worse.

Adanson's figure of Le Jatou was reproduced by Reeve (1845, pl. 27, f. 121) [9] under the name of *Murex lingua-vervecina* Chemnitz [15] incidentally referring to Adanson's name as Le Jaton, Reeve's chirography having been apparently on a par with that of Pusch. This figure is almost the "spit 'n' image" of *Murex festivus,* which species may therefore reasonably be assigned to *Jaton,* but *Murex gemma* can not.

[9] Conch. Icon., v. 3, *Murex*, pl. 16, f. 65, 1845.
[10] Le Naturaliste, p. 375, Dec. 15th, 1880.
[11] Proc. Z. S. L., pl. 11, p. 127, March, 1844.
[12] Mem. S. D. Soc. N. H., v. 1, p. 707, 1931.
[13] Polens. Palcont., pt. 2, p. 135, 1837.
[14] Hist. Nat. de Senegal, p. 129, pl. 9, f. 21, 1757.
[15] Syst. Conch. Cab., v. 10, pl. 161, f. 1540–1, 1795.

Tryon (1880, p. 116) [4] discarded the name *Muricidea* altogether, but on taxonomic rather than on nomenclatorial grounds. He transferred most of its species, *Murex gemma* among them, to *Ocenebra* Leach [16] where, as must be confessed, its smooth shell seems more at home than among the spinose forms of the genus *Murex*.

Thiele [17] retained the name *Muricidea,* in the synonymy of which he put the name *Muricopsis* Bucquoy, Dautzenberg, and Dollfus.[18] The present writer was formerly inclined to think that *Muricopsis* might replace *Muricidea* but the original description and figure of the generic type seem to exclude *Murex gemma.*

There are but few families which have been so cluttered up with superfluous nomenclature as the Muricidae, and he who has the temerity to add to this verbiage is under the moral responsibility carefully to consider the paraphrase of the question so frequently put during the war days, and to ask himself, Is this *nomen novum* really necessary? A single individual can hardly examine personally every generic type ever designated in this family, but that fact only emphasizes the importance of examining as many of them as possible. The present writer has made an honest effort to examine the original descriptions and figures of every generic type in this family set out in such systematic works as those of Cossmann [19] and Woodring [20] as well as those of the twenty-six new names published by Jousseaume (1880, pp. 335–6) [10] together with authentically named specimens where available in the Museum of the San Diego Society of Natural History, and he has concluded that the proposal of a new name for *Murex gemma* instead of adding to the confusion would clarify the situation, and he therefore offers the following:

MAXWELLIA, **genus novum.**

Shell solidly built, with an elongated canal that is nearly closed, but at no point of which is the closure quite complete.

[16] Ann. Mag. N. H., v. 20, p. 269, 1847.

[17] Handb. der Syst. Weichth., v. 1, pt. 1, pp. 293–4, 1929.

[18] Moll. Mar. du Roussillon, v. 1, p. 19, 1882.

[19] Essai Paleo. Comp., pp. 1–66, 1903.

[20] Carn. Inst. Wash. Publ. no. 385, pp. 287–96, 1928.

Body whorl with approximately six varices, whose breadth exceeds that of the spaces alternating with them, as well as the elevation of the varices themselves. Varices extending across the suture to the periphery of the adjoining volution, resembling architectural buttresses. Suture rather deep, and divided by the varices into a series of pits which are the most distinctive feature of the shell. No sutural tubes as in *Typhis* and no expanded digitations of the outer lip as in *Homalocantha*. Operculum with marginal nucleus.

This genus is named for Mr. Maxwell Smith, with whom the present writer hunted for the shells of its generic type, *Maxwellia gemma* (Sowerby),[1] in their boyhood days, in fulfillment of mutual promises exchanged at that time. The generic type has been figured by Maxwell Smith.[21]

Besides the type there are three other species that may be assigned to the new genus. *Muricidea santarosana* Dall [22] is certainly a *Maxwellia*. *Murex fimbriatus* Adams [23] is quite inadequately described, but it has been figured by Sowerby (1879, f. 215)[1] and by Tryon (1880, pl. 26, f. 240)[4] and there can be no doubt as to its generic affiliation.

The case of *Muricidea erinaceoides* (?), var. *indentata* Carpenter [24] is peculiar. The interrogation point implies uncertainty, not as to the validity of Carpenter's variety, but as to the species to which Valenciennes [25] gave the name *erinaceoides*. This name suggests similarity to *Murex erinaceus* Linnaeus [26] which is the type [27] of *Ocenebra* Leach, while *Murex erinaceoides* has been referred by Dall (loc. cit.) to *Alipurpura* (Bayle) Fischer (1884, p. 641),[8] which he considered a subgenus of *Murex*. To complicate matters further, Tryon (1880, p. 232)[4] identified *Muricidea erinaceoides* with *Murex lugubris* Broderip,[28] which may or may not be the same as the species now commonly known as *Acanthina lugubris* Sowerby (1822).

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[21] Catalog of Muricidae, pt. 1, no. 163, pl. 6, f. 12, 1938.

[22] Nautilus, v. 19, p. 14, 1905; Bull. U. S. N. M. 112, pl. 13, f. 3, 4, 1921.

[23] Proc. Z. S. L., p. 71, 1853.

[24] Mazatlán Catalog, p. 527, 1857.

[25] Rec. Obs. Humb. et Bonpl., Moll., v. 2, p. 302, 1833.

[26] Syst. Nat., 12th edit., p. 1216, 1767.

[27] Proc. Z. S. L., p. 133, 1847.

[28] Proc. Z. S. L., p. 175, 1832.

Specimens of *Murex erinaceoides* in the collection of the San Diego Society of Natural History, presumably identified accurately, indicate that this species cannot be referred to *Maxwellia,* and that its assignment to *Muricidea* was the result of Carpenter's inability to understand Valenciennes' description. Carpenter's own statement that his variety has varices "which continue over the suture, leaving deep pits" make it clear that whatever *Murex erinaceoides* may be, *Muricidea indentata* is a *Maxwellia.*

Maxwellia santarosana, Maxwellia fimbriata, and *Maxwellia indentata* possibly may prove to be a single species; in which case, Carpenter's name will prevail, since that of Adams is preoccupied. But the geographical distribution of these seems to indicate that *Maxwellia santarosana* is distinct from the other two, as it has not been taken south of Cedros Island, while the other two were taken in the Gulf of California and at Mazatlán, respectively.

Records of *Muricidea incisa* Broderip (1832, p. 176)[28] from California are in all probability based upon misidentifications of *Maxwellia gemma.* Why these two species should ever have been confused by Carpenter and by so many who have followed him is difficult to say, since the two species have little in common. *Muricidea incisa* probably belongs in *Ocenebra* where Tryon (1880, p. 123) and later Strong [29] have placed it. Its home is in the southern Central American republics. It is certainly not a *Maxwellia* and it is mentioned here merely to clear up the confusion with which it has been surrounded.

In the genus *Typhis,* the varices and the suture resemble those of *Maxwellia* which suggests the thought that the latter genus may represent the transitional link between the Typhinae and the Muricinae. The same conchological features are to be found in the genus *Homalocantha,* for which reason the present writer is inclined to think that the relationships of both *Maxwellia* and *Homalocantha* are with the Typhinae rather than with the Muricinae, but the position of the boundaries which separate subfamilies will always be a matter of personal judgment.

The writer wishes to thank Dr. Harald A. Rehder for examining a reference to which he did not have access, and especially

[29] Min. Conch. Club. Sóu. Calif., no. 51, p. 53, 1945.

Dr. S. Stillman Berry, who had in preparation a manuscript dealing with the same subject, but which he kindly surrendered when he learned of the present writer's interest in this species.

KILLING AND PRESERVATION OF BIVALVE LARVAE IN FLUIDS

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The permanent preservation of bivalve larvae admittedly presents serious difficulties, whether in fluid or in solid media. Because of the impossibility of collecting all stages of pelecypod larvae in an estuary at one time, it is necessary, especially in a comparative taxonomic study, to preserve them and to retain their natural appearance as faithfully as possible. This paper reports some preliminary experiments in the preservation of these larvae from New Jersey estuaries.

In studies directed toward identification of estuarine bivalve larval populations the year around, retention of the larvae in fluids rather than in slide preparations has seemed to facilitate rearrangement and close comparison of the specimens. These experiments have been carried out during the last 2 years principally with the larvae of *Mytilus edulis* Linné collected in Shark River, where they are numerous especially during the late winter and early spring months, and with other pelecypod prodissoconchs during summer months in Little Egg Harbor.

Since in part the valves of these larvae are of a calcareous nature, no acidic preservatives may be used, and since retention of natural coloration is desirable, strongly fading chemicals such as formalin are objectionable. In an effort to eliminate formalin, attempts were made during the summer of 1949 to discover a killing agent, other than formalin, which would cause the larvae to retract, close quickly, and retain natural coloration. Mercuric chloride, sodium hydroxide, and copper sulfate were tried. Larvae killed in a concentration of mercuric chloride of 0.008 g. per 100 cc. of bay water gaped badly, secreted much

mucus and did not retract the velum. Likewise larvae killed in approximately 0.003 *N* sodium hydroxide gaped badly and did not retract the cilia. A light blue solution of copper sulfate caused the larvae to gape and in addition an objectionable bluish precipitate formed.

Since the available chemicals in a number of varying concentrations were unsatisfactory as killing agents, an attempt was then made to determine the minimum concentration of formalin which would fulfill the requirements of a good killing agent. Accordingly on August 8 when bivalve larvae were numerous in Little Egg Harbor, three 50 liter plankton samples were pumped, and each diluted to approximately 100 cc. with bay water. Neutralized formalin 40% commercial here considered 100%) was added to each of these such that the final concentration became 0.5% in the first sample, 1.25% in the second, and 2.5% in the third. After 6 days, the soft parts of the larvae in the 1.25% and 2.5% samples were still well preserved, the soft parts were retracted, and the valves were tightly closed. In the 0.5% sample, most of the larvae were preserved acceptably. These experiments indicated that the concentration of formalin which we had been using in the field to kill larvae (4% as recommended by Stafford, 1912) was too strong. Consequently this concentration was reduced to 1%, and the following fluid larval preservative was prepared: Formalin, 10 cc.; Commercial sugar, 100 g.; Filtered bay water (20–30 $^{0}/_{00}$) to make 1,000 cc., and alkalized to approximately pH 10.

Commercial sugar was added to aid in the preservation of color (Turtox, 1947–48), as a clearing agent, and as a safety factor against accidental evaporation of the fluid. The evaporation of the preservative to a syrup is apparently non-injurious to the larvae, resulting only in clearer specimens. Addition of alkalized distilled water to the syrup quickly returns it to a workable medium.

Magnesium carbonate and sodium hydroxide have been used to alkalize the formalin. The carbonate however is only slightly soluble, and the presence of residual particles is objectionable when dealing with microscopic forms. The hydroxide forms a slight precipitate in sea water which hinders visibility. Preliminary observations would indicate that sodium bicarbonate,

which is readily soluble in sea water, might be a more suitable alkalizer. In these solutions, the pH should be held above 7; a pH of 10 appears to do no harm. The solution should be started with a high pH since, even in fluids sealed in glass vials, chemical changes continue to take place which bring the hydrogen ion concentration up to the point where erosion of the larval shells commences. Thus, to alkalize the preservative may be necessary from time to time, or replacement of the old fluid with new solution.

A second preservative has been used, which replaces the formalin with mercuric chloride. I thought that in using this fluid the good killing qualities of neutralized 1% formalin could be utilized, and its undesirable fading qualities eliminated in part by permanent preservation in the mercuric chloride fluid. This second solution is based partly on the facts that the well known and effective germicide, mercuric chloride, is particularly serviceable in a standard solution of 1:1,000 (Jordan, 1936), and that Griffith (1883) recommended an approximate concentration of 0.068 g. of mercuric chloride per 1,000 cc. of solvent for preserving mollusks: $HgCl_2$, 0.08 g.; Commercial sugar, 100 g.; Filtered bay water (20–30 $^0/_{00}$) to make 1,000 cc., and alkalized to approximately pH 10.

In order to test the relative merits of these preservative fluids, larvae were placed in each of the 3 preservatives: (a) 1% formalin, (b) 4% formalin, same as (a) except for concentration of formalin, and (c) mercuric chloride, in 5 cc. serum and vaccine vials with rubber cap stoppers. The larvae are removed from the vials for examination in finely drawn pipettes. At the present writing some 8 months later, the pH in the 3 solutions has dropped to approximately 6.8 (as checked with Hydrion pH test papers). The larvae are in a good state of preservation. By far the best results, though, have been obtained in the 1% formalin solution. In this, the earliest straight hinge stages are clear, sharply outlined and not eroded. In the 4% formalin and in the mercuric chloride solutions, a slight graying has taken place in the soft parts of the larvae. Preservation of color, unfortunately, for any length of time has not yet been achieved; in those larvae in which the color seems to be incorporated in the valves rather than in the soft parts, as in the

older stages of *Mytilus edulis, Modiolus demissus* Dillwyn, *Rochefortia planulata* Stimpson, and others, it is retained for an appreciably longer time.

M. edulis larvae have also been preserved in the 4% formalin solution for as long as 16 months and remain in a fair state of preservation. Some of these larvae, however, show signs of erosion due to an unchecked fall in pH; and in most of them the color has faded considerably, due possibly to the high concentration of formalin.

Literature cited

Carriker, M. R. (In press.) Ecological Observations on the Distribution of Oyster Larvae in New Jersey Estuaries, Ecolog. Monogr.

Griffith, J. W., 1883, The Micrographic Dictionary. 4th ed., Vol. I.

Jordan, E. O., 1936, General Bacteriology. W. B. Saunders Co.

Stafford, J., 1912, On the Recognition of Bivalve Larvae in Plankton Collections, Contr. Can. Biol. 1906–10, 221–42.

Turtox, 1947–48 Ed., Biological Field Work, p. 67.

CHONDROPOMA SCHALIEI

By H. BURRINGTON BAKER

This species of *Chondropoma,* sensu stricto, was based on my [1] descriptive notes about *"C. swifti,"* and on Dr. Henry van der Schalie's [2] remarks and excellent figure, with the addition of a few other details.[3] The description is brought together now in one place, with additional data, which may be helpful, but are not necessary for identification. The repetitions (sometimes with insignificant changes in wording) are included in quotation marks, in order to show what, besides Schalie's figure, were included in the original proposal (1950).

[1] 1941, Notulae Naturae ANSP. 88, p. 4.

[2] 1948, Misc. Publ. Mus. Zool. Univ. Mich. 70, p. 35, pl. 2, fig. 10.

[3] 1950, Naut., vol. 63 (3), p. 108.

Shell small, ovate when decollate, umbilicate; "tan unicolor, with central wall of plugged whorl orange," and with face of peristome reflection lighter (as usual); apparently attaining 5¾ to 6 whorls. Young shells subconic, with rounded apex; first 1½ whorls almost smooth and demarcated by prominent growth wrinkles; next half whorl with widely spaced riblets, which gradually are rendered crenulate by the strengthening major spiral ridges; 4th whorl with sculpture similar to ultimate. Later whorls evenly rounded, with "growth sculpture almost reduced to rows of bosses (sometimes sharp) on its spiral ridges, and to subequal sutural crests"; bosses or cusps mainly almost equally spaced in either direction, with long axes parallel to growth lines, and often connected by low ridges along them; major spirals (about 3 per mm. on sides of last whorl) becoming stronger and appearing closer towards umbilicus (as usual); microscopic spiral striae 7 to 9 times as numerous as major ridges; "last 1/10 (of body whorl) solute" and quite markedly crested. Aperture broadly ovate, almost subcircular. Peristome ("only exceeded by *C. yunquei* in peristomial expansion") often appearing double but actually multiplex, with expanded earlier lamellae forming a broad, flattish surface, which is widest and often undulate on columellar side, "with parietal angle produced (apparently more than in closely related Haitian species) to form narrowly rounded crest," slightly less angular than in restored figure, and with innermost lip (in old shells) distinctly produced in direction of growth. Operculum (partly visible inside aperture in Schalie's figure) "thin, with a weak calcareous layer, that fades out towards margin" on its later whorls, but which (as usual in Pomatiasidae) is dissolved away from the earlier ones; fitting tightly into the aperture; with about 3¼ whorls.

"Type ANSP. 186175, a female, quite similar to cited figure; it measures: length 10.7 mm., major diameter 7.0, minor 5.6, with 3⅝ whorls remaining. Males average smaller; one measures: length 8.2 mm., maj. diam. 5.8, minor 4.7, with 3⅜ whorls retained. From Cerro Capron, semidesert hills east of entrance to Guanica Harbor (southwest coast), Puerto Rico; hiding in the arid coastal limestone," and not seen climbing trees even during a rainstorm. "(Tallaboa shells more whitish; males about size of Guanica females.)"

C. schaliei, peculiarly enough from the geographic viewpoint, appears most like the Haitian forms [4] from towards the western end of that island, which perhaps may be correlated with the similarity of their arid environments. Following Dr. Bartsch's

[4] Bartsch, 1946, Bull. U. S. Nat. Mus. 192, pp. 52–59.

key (p. 52)[4] leads me to *C. blanchardi,* but these multiplex peristomes vary with age and in individuals, and the innermost lip becomes distinct after maturity. In general, *C. schaliei* seems to agree most closely with *C. genevievae* in size and sculpture, although it approaches the larger *C. gonavense* in form. In the Haitian species, the spiral sculpture, at least on the sides of the last whorl, seems less evident than the growth threads, but the reverse is true of *C. schaliei.*[1]

DISTRIBUTION OF THE MOLLUSKS IN A BASIC BOG LAKE AND ITS MARGINS

By RALPH W. DEXTER

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During the twelve years between the autumn of 1937 and the autumn of 1949, the writer collected mollusks from a glacial bog lake known as Dollar Lake in Portage County, Ohio. Collections have been made during all seasons of the year except winter. Part of the collections were made with students in classes of field zoology, ecology, and limnology; part were made by the writer working alone. Specimens were obtained with the Peterson bottom sampler, dredge net, dip net, and hand trowel. Data thus accumulated give a clear picture of the abundance and distribution of molluscan life in this bog lake and its margins.

Dollar Lake is situated near Twin Lakes, four miles northeast of Kent, on the divide between Lake Erie and Ohio River drainages. It is a relict of the Late Wisconsin glaciation, and it is quite typical of such bog lakes except that the water is for the most part basic (alkaline) rather than acidic. This fact probably explains the abundance and diversity of mollusks in this eutrophic body of water. It is roughly circular in outline, about six acres in area, with a maximum depth of 23 feet. Most of the bottom is less than 18 feet below the surface. There is no drainage, although during high water the surface waters of this lake flood a swamp margin and join those of East Twin

Lake with which there may be an underground connection because of the lack of a substantial boundary between them. The temperature range is from 0–28°C. at the surface and from 3–23°C. at the bottom. Ice to a depth of about one foot usually forms each winter from December to March. During periods of heavy rainfall, and especially during the spring thaw, the water level may be raised as much as 8–10 inches above average at which times the bog and swamp shelves are flooded. This permits the aquatic mollusks to extend their range. During periods of drought, and often by the end of the summer season, the water level may be 7–8 inches below normal level, causing the aquatic species to withdraw from the shore margin, become quiescent, or perish. The hydrogen ion concentration of surface water ranges from pH 6.8 in the spring to 8.6 in summer. The range of pH at the bottom is from 6.7 in summer to 7.5 in the late fall. Temperature and pH are uniform from top to bottom during the spring and fall overturn of the lake (spring aver. 4°C., pH 7.1; fall aver. 6°C., pH 7.3). During the summer the water is stratified from the surface (28°C.; pH 8.6) to the bottom (23°C.; pH 6.7). During the winter there is a less pronounced stratification from just under the ice (0°C., pH 7.8) to the bottom (4°C.; pH 6.9). A complete report on the temperature and hydrogen ion concentration is being prepared for publication elsewhere. Preliminary abstracts on environmental features have already been published (Dexter, 1942, 1946).

The bottom of the lake is composed of a soft, black silt composed of fine organic detritus (ooze) mixed with clay. It has a gelatinous consistency. Generally it is neutral or slightly acid in reaction. Below the depth contour of 12 feet, vascular plants do not grow, and mollusks have never been found on or in the bare bottom deposits. In the shallow marginal waters, there are four concentric zones of submerged, floating, and emergent vegetation, although two of these are not continuous around the lake. At the edge of the water is a floating sphagnum mat (quaking shelf) containing three concentric zones, two of which form a continuous margin. Behind these are a tamarack-bog community on the southwestern shores and a willow-swamp community on the northeastern shores developed on deposits of

peat moss. The swamp-type of vegetation has developed on one shore as a result of disturbance of the original bog vegetation, and in recent years the former has been spreading at the expense of the latter. Beyond the swamp, on higher ground, is a hardwood climax forest. All these zones are briefly described below, and the molluscan population of each one as well as the general abundance and distribution of each species can be determined from the table. Names of mollusks follow those used by Goodrich and van der Schalie (1944); plant names follow Schaffner (1928). Baker (1927) and Archer (1939) studied the mollusks occurring in somewhat similar habitats as those reported here.

1. *Chara-Myriophyllum* Zone. A bed of submerged plants, chiefly stonewort (*Chara* sp.) and milfoil (*M. verticillatum*) forms a circular ring around the lake from the edge of the bare bottom sediments at a depth of about 12 ft. on its outer margin to a depth of some 6 ft. on the inner margin. In most places it ranges in width from 25–50 ft., but along the shallow southeastern section it reaches nearly 100 ft. across. This zone has been increasing in extent in recent years; in places it has penetrated into the next three zones, and in some sections has partly replaced the vegetation of these adjacent zones. Usually the water conditions here are much the same as in the upper half of the lake water at the place of its greatest depth. Of the seven species of mollusks collected here, *Amnicola limosa, Valvata tricarinata,* and *Helisoma campanulatum* are most characteristic and are commonly found throughout the shallow waters of the lake.

2. *Potamogeton* Zone. At the inner edge of the preceding zone at a depth of about 6 feet begins another submerged zone consisting largely of pondweeds (*P. robinsii, lucens, pectinatus, interruptus,* and *foliosus*) with some eelgrass (*Vallisneria spiralis*) and bladderwort (*Utricularia macrorhiza*). It extends to a depth of about 2 feet, often penetrating among the stems of the floating and emergent plants of succeeding zones. Its width varies from a few feet on the steeper shores to about 15–20 feet on more gentle slopes. The water over this zone, and the next two as well, is usually much the same as the surface water of the lake. All 13 species of the aquatic mollusks re-

corded in this study were present here with abundance of each equal to or greater than that found elsewhere. Half of the species were taken in large numbers in every collection. This is the most favorable habitat for the aquatic snails.

3. *Castalia* Zone. This floating zone of white water lily (*C. odorata*) has been largely destroyed in recent years, but at its best development consisted of scattered patches of a few square yards in area around the lake at the junction of the submerged and emergent vegetation, forming a transition between them at a depth of 2–3 feet. Aquatic snails were formerly common especially on the lower surface of the floating leaves.

4. *Nymphaea-Pontederia* Zone. This emergent zone is rooted in the water at a depth of 2–3 feet with the stems and leaves elevated above the water surface. It is not yet continuous around the lake, and the two species are still segregated. If left undisturbed, patches of these two will probably merge and form a complete ring at the edge of the open water. Spadderdock (*N. advena*) forms an extensive crescent 47 feet across at the widest point around the southeastern shoreline. This tapers off at each end to a few feet in width and then forms small discontinuous patches at various points around the rest of the lake. Along the eastern shore there is a large patch of pickerel weed (*P. cordata*) 9 feet in width in place of the more prevalent spadderdock. Duckweed (*Lemna minor*) floats among both. Snails are common on the stems and also on the leaves of those plants which dip down into the water. On the wooden piles of the boat dock, set into the water of this zone, were found *Amnicola limosa* in abundance, *Menetus exacuous* and *Helisoma campanulatum* frequently, and *Lymnaea obrussa* and *Succinea retusa* occasionally.

5. *Decodon* Zone. Around the outer edge of the floating Sphagnum mat is a narrow strip composed almost entirely of swamp loosestrife or water willow (*D. verticillatus*), the roots of which are ordinarily covered by several inches of water. Along the bog shelf it is as much as 4 feet wide, while along the swamp shelf it often ranges from 7–9 feet wide. It is a continuous belt around the lake, marking the transition from open water to the quaking shelf of peat moss. Aquatic mollusks are very common in the shallow water at the base of the plants

where the water is generally alkaline, but occasionally less alkaline than the open surface water. During low water level this margin has no standing water, at which time slugs are found more commonly than the snails. At such times the soil pH is slightly acid.

6. *Toxicodendron-Vaccinium* Zone. Behind the margin of Decodon on the bog shelf is a shrub zone consisting largely of poison sumac (*T. vernix*), tall blueberry (*V. corymbosum*), and alder (*Alnus incana, A. rugosa*) growing for the most part on hummocks just above water level. At the base of these shrubs are such plants as leatherleaf (*Chamaedaphne calyculata*), cinnamon fern (*Osmunda cinnamomea*), jewelweed (*Impatiens pallida*), and ground nut (*Glycine apios*) with a growth of Sphagnum mosses intermingled with all. A few red maple (*Acer rubrum*) saplings and several other invading swamp plants are becoming established here. This zone is about 17 feet wide. The soil pH ranges from 5.0–6.0. Slugs are the most common mollusks found here except during high water when some of the aquatic snails, especially *Helisoma campanulatum* and *Gyraulus parvus* penetrate into this lowland.

7. *Larix* Zone. Behind the shrubs, on somewhat higher and larger hummocks, is a strip of tamarack (*L. laricina*) some 55 feet wide. On the hummocks around the base of the trees grow the sensitive fern (*Onoclea sensibilis*) and Canada mayflower (*Unifolium canadense*) while among the hummocks grow the shrubs of the preceding zone. The tamaracks are slowly dying out. The soil pH ranges from 4.0–5.0. A few slugs are found on the hummocks, while under loose bark of fallen tamaracks *Hawaiia minuscula* has been collected.

8. *Typha* Zone. Behind the Decodon margin on the swamp shelf is a series of patches of broad-leaved cattails (*T. latifolia*), especially in areas where disturbances have taken place. At its best development, it is some 10–20 feet wide although often it is but a very narrow transition between the Decodon margin and the shrubs behind it. Mixed with the cattail are such plants as purple marshlocks (*Comarum palustre*). Nearly all the aquatic mollusks found in this study have been collected in the shallow water here. The water here is always considerably less alkaline than the preceding zone, and sometimes is slightly

acid. The soil pH averages about 6.0. Baker (1927) found the mollusks in his study to be most abundant from shoreline to a depth of 6 feet. Below that depth he found only seven out of 30 species and varieties. The same general results are shown at this lake.

9. *Cephalanthus* Zone. At the edge of the water-covered portion of the shelf is a discontinuous margin of buttonbush (*C. occidentalis*). Among these shrubs grow such plants as red osier dogwood (*Cornus stolonifera*), swamp rose (*Rosa carolina*), swamp milkweed (*Asclepias incarnata*), royal fern (*Osmunda regalis*), marsh fern (*Dryopteris thelypteris*), rushes and sedges. Here again, this zone is largely the result of revegetation following disturbance. At its best it extends some 25 feet across. The soil reaction is slightly acid. The most characteristic mollusk here is the amphibious snail *Succinea retusa.* Only during high water is this section flooded. At such times aquatic species will be found on the surface as well as in the Sphagnum mat where some seem to survive between periods of flooding. This zone and the preceding one are rapidly being crowded out by the next one.

10. *Alnus* Zone. The shrub zone of the swamp shelf consists largely of alder (*mixture of A. incana and rugosa*). In openings and around the edges may herbaceous plants are found such as smartweed (*Polygonum* spp.), bittersweet (*Solanum dulcamara*), jewelweed, swamp milkweed, ground nut, and hog peanut (*Falcata comosa*), but for the most part it is a solid stand of the species of *Alnus* some 28 feet in width on the average. These shrubs are usually above normal water level, often on hummocks, although subject to flooding. The soil reaction is slightly acid and the flood waters are less alkaline than in open water. Here some of the land snails will be found when it is dry; aquatic species when flooded. Some of the aquatic species survive in puddles of water or in moist peat moss among the clumps of shrubs. The dual nature of the habitat has resulted in the aggregation of the largest number of molluscan species found at this lake. Besides the movement of mollusks associated with high and low water levels, Cheatum (1934) has shown that when the temperature declines in the fall, shallow water snails migrate into deeper water, to spend the winter. In the spring, the reverse is true.

11. *Salix* Zone. The inner edge of the swamp shelf is dominated by willow (*S. nigra*). Some red maple, slippery elm (*Ulmus fulva*), and wild cherry (*Prunus virginiana*) saplings, flowering dogwood (*Cynoxcylon floridium*), hawthorn (*Crataegus sp.*), and elderberry (*Sambucus canadensis*) are also present. There is an understory of common weeds, herbs, and ferns among the shrubs and trees. The zone averages 23 feet in width; the soil reaction is nearly neutral. The clay soil is always moist but seldom flooded. A few aquatic mollusks seem to survive in the wet soil. Land gastropods are common here.

ZONATION OF MOLLUSKS AT DOLLAR LAKE

Zones:	1	2	3	4	5	6	7	8	9	10	11	12
Menetus exacuous	S	C	S	S	C			N	HS			
Valvata tricarinata	C	C	C	C	C			C	HS	HS		
Ammicola limosa	A	A	A	A	A	HS		C	HS	HS		
Helisoma campanulatum	C	C	C	N	C	HN		C	HS	HN		
Physa heterostropha	S	C	N	N	C	HS		C	HN	HN		
Gyraulus parvus	N	C	N	N	S	HN		C	HN	HC	HS	
Pisidium spp.	S	N	N	N	S	HS		S	HN	HN	HS	
Ferrissia sp.		N		S								
Musculium spp.		S		S	N			S		HS		
Lymnaea obrussa		N			N			S	HS	HN		
Lymnaea palustris		N	S		N			N	HN	HS		
Sphaerium spp.		C		N	C	HS		C	HN	HN	HS	
Succinea retusa		S	N	N	N			C	C	N	N	
Deroceras (2 spp.)				S	S	N	S	N	N	C	C	C
Hawaiia minuscula						S	N			N	N	
Pallifera sp.						S						S
Immature land snails									S	N	C	N
Stenotrema hirsutum										N	C	S
Anguispira alternata										N	C	C
Discus patulus											N	
Mesodon thyroidus											N	N
Triodopsis tridentata											S	S
Strobilops aenea												S

In the accompanying chart, the numbers at the tops of the columns correspond to the zones in the body of the paper. A = abundant; C = common; N = numerous; S = scarce; H = during high water.

12. *Quercus–Fagus–Ulmus* Zone. On the bluff bordering the swamp shelf is an upland hardwood forest margin some 80 ft. wide of red oak (*Q. rubra*), white oak (*Q. alba*), beech (*F. grandifolia*), American elm (*U. americana*), pignut (*Hicoria glabra*), white ash (*Fraxinus americana*), and cucumber magnolia (*Magnolia acuminata*). The understory consists of such plants as witch-hazel (*Hamamelis virginiana*), green brier (*Smilax rotundifolia*) and a floor of woodland herbs. The soil varies from slightly acid to neutral in reaction. Land gastropods are found under logs and loose bark, debris, and in the leaf mold, but not as commonly in general as in the lower willow zone.

Literature cited

Archer, A. F., 1939, The Ecology of the Mollusca of the Edwin S. George Reserve, Livingston County, Michigan. Occas. Papers of the Mus. of Zool. University of Michigan. No. 398. 24 pp.

Baker, F. C., 1927, Molluscan Associations of White Lake, Michigan: A Study of a Small Inland Lake from an Ecological and Systematic Viewpoint. Ecology, 8 (3), 353–370.

Cheatum, E. P., 1934, Limnological Investigations on Respiration, Annual Migratory Cycle, and Other Related Phenomena in Fresh-Water Pulmonate Snails. Trans. of the Micros. Soc., 53 (4), 348–407.

Dexter, R. W., 1942, A Basic Bog Lake Developing a Swamp-Type Succession in Northeastern Ohio. Bull. Ecol. Soc. Amer., 23 (4), 66. 1946. Monthly and Annual Fluctuations of Temperature and Hydrogen Ion Concentration in a Basic Bog Lake. Bull. Ecol. Soc. Amer., 27 (1), 5.

Goodrich, C., and H. van der Schalie, 1944, A Revision of the Mollusca of Indiana. Amer. Midl. Nat., 32 (2), 257–326.

Schaffner, J. H., 1928, Field Manual of the Flora of Ohio.

THE TYPE OF A SPECIES

By H. BURRINGTON BAKER

From the viewpoint of nomenclature, the true or "primary" type material (cf. "proterotypes")[1] of a species or subspecies is determined by its indication, definition or description at the time of its original publication (cf. Art. 25a).[2] "In no case is the word '*indication*' to be construed as including museum labels, museum specimens, or. . . ."[3] "Specific and subspecific names are subject to the same rules and recommendations. . . ." (Art. 11.)[2]

If only one specimen is the basis for the original proposal of a species, it is the type (cf. "holotype")[1] and there are no paratypes. Many, probably the majority of new species of land snails belong in this category, which usually can be recognized by the inclusion of only one set of dimensions, although the description also must be studied carefully. Such a monotypic condition is always definite; proof that it does not exist must come from the original publication.[4]

When a species is not monotypic, and a type specimen ("holotype") is designated by the original author, the other examples of the true type material become paratypes (Appendix).[2] If no type is designated originally, all the included specimens constitute the undivided type material or type lot (cf. "syntype" or "cotype").[1]

"The division of a species into two or more restricted species is subject to the same rules as the division of a genus." (Art.

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[1] 1905, Schuchert and Buckman, Science (N. S.) 21, pp. 899–901; also quoted in "The Century Dictionary Supplement," New York (1914). Almost none of these superfluous compounds of the word "type" has had any exact or constant meaning. (Only genotype and paratypes are used in the rules.) Despite Article 31, many of them also have been combined with genotype (and even with "subgenotype"!): e.g., "lectogenotype" and "genolectotype." Cf. Walter Horn, 1929, 10th Congrès Internat. Zool. Budapest, 2, pp. 1022–1042; and D. L. Frizzell, 1933, American Midland Naturalist, 14, pp. 637–668, for lengthy glossaries.

[2] International rules (or code) of zoölogical nomenclature, articles, and appendix.

[3] 1907. Opinion 1 of the international commission.

[4] Cf. Opinions 22, 30, and 47, although they deal with genera.

31.)[2] As previously discussed,[5] the code makes no provision for subsequent action prior to such division. Richter [6] has pointed out that the rules (Art. 30)[2] for the type of a genus (genotype) probably also should be utilized for the division of a species, in so far as they are applicable. Changing two words (now put in *italics*) in article 30g would give: If an author, in publishing a *species* with more than one valid *specimen,* fails to designate (see a)[7] or to indicate (see b, d)[8] its type, any subsequent author may select the type, and such designation is not subject to change. Thus subsequent selection of type (cf. "lectotype")[1] is only legitimate when: (1) the species is being divided, (2) it originally included more than one *valid* specimen, and (3) no type was designated in the original publication.

All examples which are not included in the original proposal of a species (cf. "apotypes")[1] lack legal status under the present rules. However, if the original type specimen is lost, ruined or even unavailable, an example to serve as a standard of reference (cf. "neotype")[9] is useful, even though it puts no legal obligation on anybody else. Of course, if this standard of reference is one of the paratypes, it has the advantage of being an original or "primary" example. Also, secondary consideration (primary in monotypic species) should be given to any specimen (cf. "heautotype")[1] named or figured by the author of the species, even subsequently to his original publication. Finally, if all material identified by the original author be lost, a new figure and description of any other example (cf. "plesiotype"),[1] especially if from the type locality, may serve as a very welcome standard of reference for future systematic studies, even though it has no arbitrary or legal status.

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[5] 1950, Nautilus, 63 (4), pp. 128–130.

[6] 1948, "Einführung in die zoologische Nomenklatur," etc., p. 182.

[7] Type by original designation.

[8] Neither "b" or "d" is applicable to species. Richter (1948, p. 170) printed "(vgl. b–d)" but "c" (monotypic) was already excluded.

[9] Richter (1948, p. 37) specifically gave preference to the use of a paratype as a "neotype," which is close to the original (generic) meaning. Schenk and McMasters (1936, "Procedure in Taxonomy," p. 7) excluded original type material, but then confusingly included "neotype" in their "primary types."

HIATELLA DAUDIN VERSUS SAXICAVA BELLEVUE

By HENRY DODGE

(Continued from April number)

Sherborn gave the date of Bosc's work as 1802 in the Additions to the Bibliography of Sherborn's Index (1932), whereas in the main Index he used 1801.

Through the courtesy of Dr. L. C. Cox of the Malacological Society of London, I was enabled to have an examination made of Sherborn's original manuscript, which is, I understand, in the custody of the British Museum (Natural History), in an endeavor to throw some light on Sherborn's use of the two different dates. A note was discovered reading: "Buffon, Castel's ed. (Déterville), J.Gén.Litt. Fr. 5 vols.18, Vend.10 (1801) Bosc. Coq." Elsewhere in the manuscript he had written: "L.A.G. Bosc, Coquilles, An 10, 1802, 5.vols.," but here the date had been altered to 1801, and the following added: "all altered in the slips," and "corrected from J.Gén. Litt.Fr." I am indebted to Mr. C. P. Castell of the Department of Geology, British Museum, for his kindness in examining the Sherborn notes.

The "Journal Général de la Littérature de France," to which the above notes refer, was a bibliographic monthly which appeared in Paris in the first decades of the nineteenth century. It was not available to Mr. Castell, but the necessary volume is in the New York Public Library, the Boston Athenaeum, Harvard University, the University of Minnesota, the American Philosophical Society, Philadelphia and the Library Company of Philadelphia. Its volume 4 bears the date "1801" on its title-page, and on page 291 of this volume is printed a review of the Bosc work. The notice is short but certainly covered a published work, as the periodical reviewed all important books, in certain categories, currently appearing. The contents, the format and even the price are stated. Moreover, the review appeared in the fascicule for "Vendémaire An 10 de la République francaise," the Republican "month" which covered the period September 23 to October 22, 1801. Thus we have unimpeachable, contemporary evidence that the Bosc work was published prior to the latter date. Under the Rules, therefore, *Hiatella* has priority over

Saxicava. Little would be gained by applying for a suspension of the Rules in favor of the widely-used *Saxicava*, even if it could be obtained, as the name *Hiatella* is already known to all conchologists as a possible valid substitute, and therefore little confusion would result from its future use.

As should be added, *Hiatella* was, with Daudin, a manuscript name, and should be used as "*Hiatella* Daudin in Bosc." Bosc confirms this (*op. cit.*, vol. 3, p. 120) in saying: "This genus has been created (a été fait) by Daudin, who kindly permitted me *to make use of his interesting manuscripts for this work.*" (The italics are mine.)

The question of the type of *Hiatella* may be simply, if somewhat arbitrarily decided. Daudin cited only two species in the genus, whose descriptions read (Translation):

Hiatella gaping at both ends. *Hiatella biaperta*. Concentrically wrinkled, with two spinous, divergent ribs, gaping at both ends. Plate 21, fig. 2.

Hiatella gaping at both ends. *Hiatella monoperta*. Transversely wrinkled, with two spinous, divergent ribs, gaping at one end. Plate 21, fig. 1.

Tranquebar, a region on the south-east coast of India, was given as the locality of both species, and the specimens were said to come from the cabinet of Favanne.

Figure 2 shows a shell which can well be taken for *Mya arctica*, both from the description and the figure itself. The same may be said for the other figure, which shows a smaller shell. Both have the pointed scales on the ribs (which Daudin describes as spines) that distinguish one form of *arctica*. Neither show any indication of a gape nor do they picture the hinge. The difference in the sculpture, as stated in the descriptions, is not understood. Most *Saxicava* are coarsely and concentrically wrinkled and possibly Daudin was misled, as to the direction of the wrinkles, by the shape of the specimen before him. The mention of a difference in the gape is also not understood. *Saxicava* may be described as closed, but with an aperture for the byssus. I know of no form gaping at both ends. Both species are described as having the spiny ribs characteristic of our *arctica*.

In any evaluation of a description of a *Saxicava*, and particularly of the complex containing *arctica*, it must be remembered that the shells are extremely variable, due to their habitats and

differences in their burrowing habits. This variability has resulted in several names which may or may not be of specific value. The forms *arctica, rugosa* and *pholadis,* for example, are thought by some writers to be distinct, and by others to be mere ecological varieties of the same species. Bucquoy, Dautzenberg and Dollfus believe *arctica* and *rugosa,* at least, to be separable. Grant and Gale (1931, p. 428), although they cite all three as good species, suggest that they may all be varieties of the same shell. Another difficulty one encounters in this group is that many writers, both in their descriptions and their figures, have apparently confused the various forms, as for instance by describing the spines or scales on the ribs for a form which another writer describes without that feature, while giving it to another.

I am strongly inclined to the view that the three above-named forms, at least, are all habitat forms of one very variable species which may be called *arctica s.s.,* with *rugosa* and *pholadis* and several other forms, which have received names, as varieties. I am also convinced that both of the shells described and figured in Bosc were not only forms of *H. arctica,* but, from the mention of the spines, were that form which I have called the typical one. Inasmuch as Linnaeus described *arctica* with emphasis on these spines—"valvulis carinis duabus spinulosis"—there is no question but that we have correctly determined our *arctica* to be the representative of the Linnaean species, and entitled to bear the name. Until a study can be made of an adequate series of *Hiatella* from Tranquebar, or at least that part of the Indian Ocean, or until the unlikely event of Daudin's types being found, the type of the genus may be cited safely as *H. biaperta* Daudin + *H. monoperta* Daudin, = *Mya arctica* Linné, by subjective monotypy.[4]

One further reference to the name *Hiatella* Daudin should be mentioned. Bosc's work merely referred to Daudin's "interesting manuscripts," without giving any date to them. If they were mere unpublished notes their date or dates are not important

[4] We know that *Hiatella,* which is primarily a boreal genus, has a very wide temperature range, *H. arctica* itself having been reported in the Western Hemisphere as far south as Panama. There is little reason to doubt that it could live on the coasts of India. The U. S. National Museum has specimens of *Saxicava* from Ceylon and Siam (personal communication, species not stated).

in fixing the date of the valid erection of the genus. There is also, however, a dated and published work of Daudin, the existence of which, although it proved to be of no significance so far as *Hiatella* is concerned, served to temporarily becloud the issue. In J. E. Gray's "List of British Animals" (1851, vol. 7, pp. 87–89) the compiler allots the genus *Saxicava* to *S. rugosa* Linné and *Hiatella* to *S. arctica* Linné, and cites for the name *Hiatella* a "memoir" of Daudin said to date from 1800, a year prior to Bosc's publication of the name. Dall (1898, pp. 833–834) was sufficiently interested by this reference to investigate it, and I will quote his remarks in full:

"Bosc and Roissy do not refer to this memoir, but mention two species from Tranquebar in Favanne's collection, both of which are figured in the atlas to Bosc's work. Lamarck without ceremony refers Bosc's figures to *Mya arctica* Linné and cites but that single species under the genus. Dr. Gray cites *Hiatella arctica* from Daudin's memoir of 1800, but without mentioning page or figure for it, which leads to the suspicion that he may not have actually seen the paper itself. If his citations be correct, there would seem to be no doubt that *Hiatella* should be adopted in place of the later *Saxicava,* but in the doubt that remains I hesitate to make the change, and would prefer to leave it to some one who can consult the original memoir."

Dall added the following footnote to the above: "Since this was written I have learned, through the kindness of Mr. Edgar A. Smith of the British Museum, *that there is no mention of* Hiatella *in Daudin's memoir of 1800.*" (Italics mine.)

A copy of the 1800 memoir, of which Dall was apparently unaware, is in the library of the American Museum of Natural History in New York. It is entitled "Receuil de Mémoires et de Notes sur les espèces inédites ou peu connues de Mollusques, de Vers, et de Zoophytes." The only group covered which contains mollusks is *Serpula* Linné. There is no mention of *Hiatella.* The booklet in 12 mo., is apparently complete and the number of pages and plates is the same as is reported in the "Catalogue of the Library of the British Museum" (pp. 50, 4 plates). Obviously Gray had not seen a copy.

The Daudin "manuscripts," referred to by Bosc, have not, so far as I have been able to determine, been referred to again

and are probably not preserved. In any event, Bosc, 1801 is the first published record of the name *Hiatella.*

References cited

Anon. 1801. Journal général de la littérature de France. Vol. 4. Paris.

Bosc, L. A. G. 1801. Histoire naturelle des coquilles. Vol. 3. Paris.

Bucquoy, E., Phillippe Dautzenberg and Gustave F. Dollfus. 1896. Les mollusques marins du Roussillon. Vol. 2, fasc. 11. Paris.

Cotton, Bernard C., and Frank K. Godfrey. 1938. The molluscs of South Australia. Handbook of the flora and fauna of South Australia. South Australian branch of British science guild. Part 1, Pelecypoda. Adelaide.

Dall, William Healey. 1898. Trans. Wagner Free Inst. Sci., vol. 5, pt. 4. Philadelphia.

Daudin, Francois Marie. 1800. Receuil de Mémoires et de Notes sur les espèces inédites ou peu connues de Mollusques, de Vers, et de Zoophytes. Paris.

Fleuriau de Bellevue, C. 1802. Bull. Sci. Soc. Philom., no. 62, pp. 105–109. Paris.
1802. Jour. de physique, vol. 54, pp. 345–355. Paris.

Grant, Ulysses S. IV, and Hoyt Rodney Gale. 1931. Mem. San Diego Soc. Nat. Hist., vol. 1.

Gray, John Edward. 1851. List of the specimens of British animals in the collection of the British Museum, pt. 7. London.

Lamy, Edouard. 1915. Bull. Mus. d'Hist. Nat., Paris, vol. 21, pp. 243–252.
1921. [idem], vol. 27, pp. 361–365.

Linné, Carl von. 1767. Systema naturae per regna tria naturae . . . , vol. 1, regnum animale. Stockholm.

Sherborn, C. D. 1927. Index animalium . . . Vol. 3. London.
1932. Additions to the Bibliography of Sherborn's Index. London.

Smith, Maxwell. 1940. World-wide sea shells. Lantana.

NEW SUBGENERA OF BUSYCON ROEDING

By E. SYDNEY MARKS

FULGUROPSIS, **subgenus novum.**

Shell is dextral, large, pyriform, and similar to that of *Busycon* s. s., to which this group is closely related, but with canaliculate suture and with rounded or keeled shoulders (without spines or tubercles) in the adult stage. Protoconch is smooth, glossy, oblique, and comprised of two volutions. Canal is long, straight and open. Columellar lip is without folds or plaits. Outer lip is simple and entire. No posterior canal is present. Operculum is horny, and similar to that of *Busycon,* s. s. Periostracum is generally lost. Color of shell is buffy or gray, and is typically marked, at least in younger stages, with "lightning flashes" of chestnut brown. Aperture is usually reddish within. Shell generally has sculpture of fine, revolving lines or ridges, which typically show within the aperture. Type species: *Busycon* (*F.*) *pyrum* (Dillwyn) = *Bulla pyrum* Dillwyn, 1817, Cat. I, p. 485.

Fulguropsis differs from *Busycon,* s. s., in the following particulars: Canaliculate suture, different protoconch of two whorls, and absence of spines or tubercles.

The following species are included: *Busycon* (*Fulguropsis*) *pyrum* (Dillwyn) and *B.* (*F.*) *canaliculatum* = *Murex canaliculatus* Linné, 1767. Fossil species are: *B.* (*F.*) *pyriforme* = *Sycotypus pyriformis* Conrad, 1867, and *B.* (*F.*) *excavatum* = *Fulgur excavatus* Conrad, 1840.

Fulguropsis thus replaces *Sycotypus* Gill, 1867, not Gray, 1847.

SYCOFULGUR, **subgenus novum.**

The Miocene type species, *Busycon* (*Sycofulgur*) *rugosum* = *Fulgur rugosus* Conrad, 1840, Proc. Acad. Nat. Sci. Philadelphia, vol. 1, p. 307, differs in having nodes on its shell throughout its growth; otherwise it is like *Fulguropsis.*

NOTES AND NEWS

Dates of The Nautilus.—Volume 63, no. 1, pp. 1–36, pls. 1 and 2, was mailed Sept. 19, 1949. No. 2, pp. 37–72, pls. 3, 4 and frontispiece, Nov. 1, 1949. No. 3, pp. 73–108, pls. 5 and 6, Feb. 13, 1950. No. 4, pp. 109–144, i–vi, pls. 7–10, April 4, 1950.—H. B. B.

The status of Vallonia excentrica Sterki.—*Vallonia excentrica* differs from *V. pulchella* (Müll.) only in having a more oblong contour of the shell and umbilicus. Since the two forms can be separated with only a very small residue of doubtful specimens, they have been generally accepted as being distinct species.

While examining a series of *V. costata* (Müll.), I found that it also contained round and excentric forms. This led to an examination of all the species in my collection, and the two forms were found in every one—in *V. parvula* Sterki, *V. gracilicosta* Reinhardt, *V. perspectiva* Sterki, and *V. cyclophorella* Sterki. The excentric character is probably a single gene mutation which occurs throughout the genus, and *V. excentrica* is but a form of *V. pulchella*.—Leslie Hubricht.

Viviparus chinensis.—During recent months, the opportunity presented itself, for me to collect viviparous snails from the ponds of New York City. On three trips, 33 *Viviparus chinensis* and 25 *Viviparus contectoides* were collected. There were many more available in each place. The pond in Forest Park was very low, and covered with water plants. In four to five inches of water, there were various sizes of *V. chinensis malleatus* (Reeve) most of them 2½ to 3¼ inches. In Central Park, I found no *V. chinensis,* but there are specimens of *Viviparus contectoides.* However, half of those I found, were dead. Brooklyn Botanic Gardens also has *V. chinensis,* but in smaller size, and, where I looked, smaller number.

Sixteen *V. chinensis* and seven *V. contectoides* were female, and when examined, found to hold numerous tiny shells. The *V. chinensis* young were contained within a white square of coagulated albumen about 3/16 inch in size. The *V. contectoides* young were inside round white pellets of the same substance. Three tiny *V. chinensis* arrived on a saucer while I was photo-

graphing a living specimen. In six weeks they have tripled their diameter, thriving on chopped lettuce leaves.—Dorothy L. Freas, 8935 86th Street, Woodhaven 21, N. Y.

Subdivisions of Sagda.—*Sagda* Beck, 1837, Index Moll., p. 9, was proposed as a subgenus of *Helix*, with 2 unquestioned species: (*H.*) *S. alveolata* Beck, and (*H.*) *S. australis* (Ch.) Beck. A more complete definition of *Sagda* was given by Pfeiffer, 1845, Zeitschr. Malac. 2, p. 81. Herrmannsen, 1848, Ind. Gener. Moll. 2, p. 411, selected the first species as type. This type species, *S. alveolata,* is founded on the citation of two figures from Férussac's "Histoire," one of which must be an error of some sort; so the type of *Helix epistylioides* Fér., 1822, pl. 51B, fig. 2, left hand shell, is hereby selected as the type of *S. alveolata* Beck. This makes *Parahelix* Ihering, 1892, type *Helix jayana* C. B. Adams, 1845, a subjective synonym, incorrectly used by me, 1935, Naut., 49 (2), p. 53, as the name of the group which included the type species of *Sagda, S.* (*S.*) *epistylioides* (Fér.).

Epistylia Swainson, 1840, becomes the name of the group which I called *Sagda,* sensu stricto. *Epistyla* Swainson, 1840, Treat. Malac., p. 331, takes as type by monotypy *E. conica* Sw., of which the shell figured in "Sowb. Man. f. 281" is selected as the type. *E. conica* is a synonym of *Sagda* (*Epistylia*) *cookiana* = *Helix cookiana* Gmelin, 1790. *Epistyla* is evidently a misspelling of *Epistylia* Swainson, 1840, p. 165, which takes the same type, although figure 18a, also referred to as *E. conica*, represents a different, but unidentifiable species. Swainson made many errors of this sort (cf. Opinion 26). All these species are from Jamaica.—H. Burrington Baker.

Daniel L. Emery died April 11, 1950, aged 89. He will be missed greatly by his many friends.

Living animals of *Campeloma, Pleurocera* and *Goniobasis,* for studies on cercaria, are desired by: Melle Buttner, Institut de Parasitologie, 15, rue de l'Ecole de Médecine, Paris, 6ème, France. These may be packed in damp cotton and shipped sample post, if the package is not air tight. Label: Echantillon zoologique sans valeur.

Daniel Littlefield Emery

San Diego, California,
June, 1947

THE NAUTILUS

Vol. 64 OCTOBER, 1950 No. 2

NEW FOUNTAIN SNAILS FROM FLORIDA

By H. A. PILSBRY

In the course of working up the Pliocene fresh water mollusks collected by Messrs. Wm. G. Fargo and C. R. Locklin in the St. Petersburg bed, there was frequent occasion for comparisons with their descendants among the living species of Florida. One result was the recognition of species overlooked up to this time.

Silver Spring, mentioned in the locality paragraph for the following species, is not the famous Silver Springs near Ocala. It is a beautiful but smaller spring of the same character, near the west shore of Lake George. It gives birth to a short stream flowing into the lake about two and two-thirds miles north of the mouth of Juniper Creek, which is at the southwest corner of Lake George. That country was a delightful wilderness fifty-six years ago, when Charles W. Johnson and I were there. The stream we rowed up to Silver Spring was populous with alligators, and alas! mosquitos. The spring is now in the Ocala National Forest.

FONTIGENS OXYBELES **new species.** Plate 3, figs. 1, 1a, 1b.

The turrited shell tapers regularly and is imperforate or very narrowly rimate; thin; very pale gray, but not transparent; the surface smooth. The apex is very small. Whorls are strongly convex, the last below the periphery tapering downward. The suture is deeply impressed. The aperture is ovate. The columellar margin of peristome is thinner and built forward less than in *F. nickliniana.*

Length 5.7 mm., diameter 2.3 mm., length aperture 1.9 mm.; 6½ whorls. Type, fig. 1.

Length 4.9 mm., diameter 1.9 mm.; 6 whorls.

Length 4 mm., diameter 2 mm., length of aperture 1.6 mm.; 5½ whorls.

Florida: Silver Spring Run, a stream entering the west side of Lake George, Marion Co. (Pilsbry and Johnson, 1894.) Type and paratypes ANSP. 186751.

This snail has been called *Paludestrina nickliniana attenuata* Hald.[1] as in Nautilus 13:22. It differs from *attenuata* chiefly by the decidedly smaller apex of the Florida species as shown in the photographs, figs. 1 (*oxybeles*) and 4, 4a (*attenuata*).

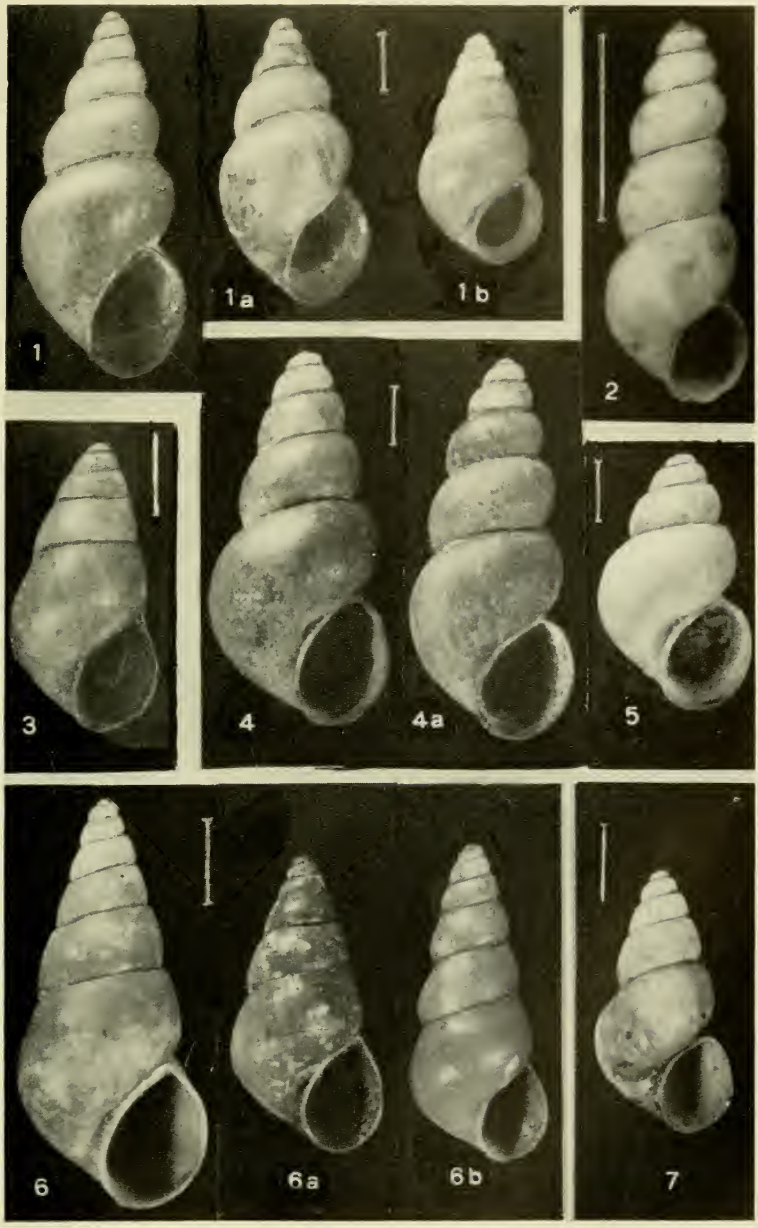
Fontigens nickliniana (Lea), from the type locality, Hot Springs, Bath Co., Virginia (Plate 3, fig. 5) is a more solid, unbilicate shell, with more obtuse summit than *F. oxybeles*. I have seen no specimens of *nickliniana* or *attenuata* from the Gulf States, the southern locality known to me being a lot said to be from North Carolina on rather dubious authority.

"Hydrobia" blacki Pils., from Andros, Bahamas, in a long series examined, differs from *F. oxybeles* by having the later several whorls decidedly less convex. *H. blacki* has been synonymized with *"Hydrobia" tenuipes* by Mr. Clench (Mem. de la Soc. Cubana de Hist. Nat. 12:314) but I think without sufficient consideration.[2] The largest *tenuipes* in a large number seen is 4.5 mm. long. The usual maximum size is length 3.5 mm., diameter 2 mm., length aperture 1 mm., 5½ whorls (Pl. 3, Fig. 3, Jacksonville, Fla.). *"Hydrobia" blacki* of Andros (Pl. 3, figs. 6, 6a, 6b) is usually larger with more whorls than *tenuipes*, up to 5 × 2.5 mm., of 7 whorls, others 4.6 mm. long, 7 whorls, and 4.4 mm. with 6 whorls. The shell has a straight-sided shape, the spire more slender above, towards the apex, than in *tenuipes*. In lots of *L. tenuipes* examined from many places along the coastal plain and in Florida there are no shells with these characters of the Andros species. The photographs speak for themselves.

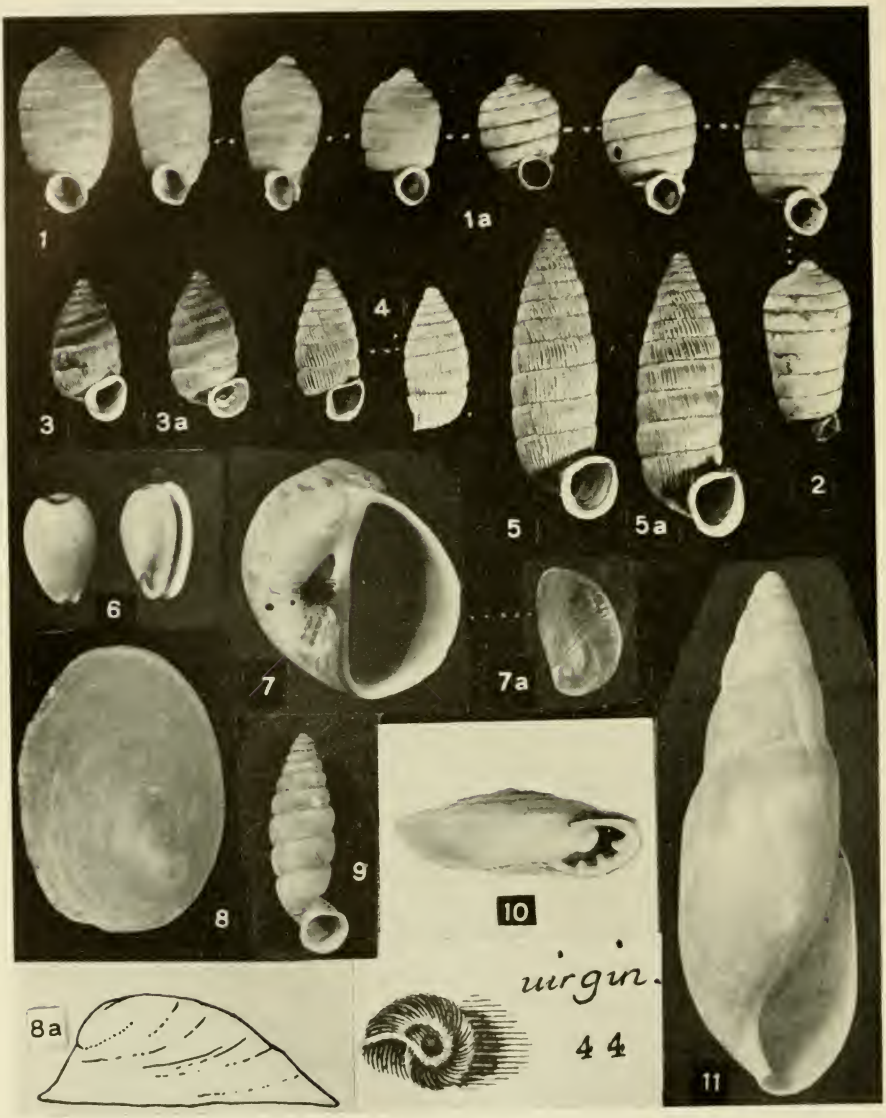
The largest one of a lot identified by Mr. Clench as *"Hydrobia" tenuipes* from Eight Mile Rock, Grand Bahama Island, kindly sent by Mr. Clench, is shown in Pl. 3, fig. 7. Length 3.6 mm., with 5½ whorls. The smaller specimens in the lot, having 4⅔ to 5 whorls, are closely similar to continental *L. tenuipes*, though the whorls are slightly more convex. None of the Grand

[1] *F. attenuata* (Hald.) is usually regarded as an ecologic form of *F. nickliniana*.

[2] The paper cited, though on the whole an excellent work, shows other signs of rather hasty preparation. Thus, a form of the pelagic *Litiopa melanostoma* Rang was described as a new species and new subgenus of *Leptinaria*.



Fountain snails from Florida, etc.
Scale lines = 1 mm.



FIGS. 1–2, *Holospira roemeri brevissima*. 3–5a, New Texan *Holospirae*. 6, *Marginella hilli*. 7, 7a, *Polinices clarki*. 8, 8a, *Hebetancylus* n. sp. 9, *Holospira kriegeri* × 3. 10, *Ashmunella*, n. sp. 11, *Englandina bailyi*. 44, *Helisoma anceps*, from Lister.

Bahama specimens seen appear to be specifically identical with *H. blacki*.

The generic position of *blacki* is uncertain, in the absence of information on dentition and verge. It may be a *Littoridina*. I refer *tenuipes* Couper to the genus *Littoridina*, though the penial appendages are simpler than in the type of that genus.

FONTIGENS WEBERI **new species.** Plate 3, fig. 2.

The minute shell is thin, subperforate, turrited, with rather obtuse apex; of 6 strongly convex whorls joined by a deeply impressed suture. Surface smooth. The aperture is ovate, rounded posteriorly, the columellar margin straightened, scarcely expanded.

Length 2 mm., diameter 0.8 mm., length aperture 0.5 mm.

Florida: West Lake, Cape Sable, collected by J. A. Weber. Type 186586 ANSP.

This snail resembles the slimmest specimens seen of *F. oxybeles*, but the apex is more obtuse, though the shell as a whole is narrower. With about the same number of whorls, *F. weberi* is only from about a third to a half as long as *F. oxybeles*. *F. diaboli*[3] of Val Verde Co., Texas, is a similar small species, but it tapers more rapidly and is more distinctly umbilicate. That *F. weberi* belongs to *Fontigens* may seem improbable on account of the locality, the water of West Lake being somewhat brackish. As the name implies, *Fontigens* normally inhabits the clear streams of springs. However, no living specimens were found, and it may be from some spring feeding the lake.

The figure is due to Dr. Olsson's skill with the camera. It is named in honor of Mr. J. A. Weber of Miami, who found it.

PLATE 3

The figures are from photographs

FIGS. 1. (type), 1a, 1b. *Fontigens oxybeles.*
FIG. 2. *Fontigens weberi*, Type.
FIG. 3. *Littoridina tenuipes* (Couper). Jacksonville, Florida.
FIG. 4, 4a. *Fontigens attenuata* (Hald.). N. C.
FIG. 5. *Fontigens nickliniana* (Lea), topotype.
FIG. 6. (type), 6a, 6b. *"Hydrobia" blacki* Pils. Andros, Bahamas.
FIG. 7. *L. tenuipes* var., Grand Bahama.
The scale lines are 1 mm. long.

[3] *Paludestrina diaboli* Pilsbry, 1906, Proc. A.N.S. Phila. p. 170, fig. 36.

TETHYS (APLYSIA) WILLCOXI HEILPRIN IN NARRAGANSETT BAY AND OTHER RHODE ISLAND WATERS

By DONALD J. ZINN

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Tethys willcoxi, the Sea Hare described by Heilprin in 1886 as a littoral swimming benthonic form from the coast of Florida, was found in unusually large numbers in Rhode Island waters in the months of October and November, 1949. There are no previous records known to the author which indicate the presence of this opisthobranchiate mollusk in such quantity or over such a long period of time, in this general area.

Merriman ('37) reported the capture of one specimen on October 25, 1936 at Newport from a large floating fish trap, "which was located less than a mile offshore from the rocks east of Bailey's Beach." Sixteen years before Merriman's observations, Sanford ('22) stated:

"On October 9, 1921, a number of those curious tecti-branch mollusks known as Sea Hare, *Tethys* (*Aplysia*) *willcoxi* Heilprin, appeared in the West Passage of Narragansett Bay, R. I., coming in on the flood of the tide and disappearing on its ebb. As the tide was going out only two specimens were secured by the writer. . . . A second trip to the same station, on October 16, yielded two more specimens, but none was found on any other R. I. or Conn. shore as far south as New London."

These are the only two accounts of this animal in Rhode Island waters. Earlier, Johnson ('15) gave the type location as Little Gasparilla Bay, West Coast of Florida, and pointed out that its occurrence in New England to that time as a matter of record was confined solely to Vineyard Sound and Buzzards Bay:

"Katama Bay, October 31, 1900; Buzzards Bay, October 11, 1906; New Bedford; Wesport; Lamberts Cove; Tarpaulin Cove; Robinsons Hole and Menemsha Bight (Sumner, Osburn, and Cole)."

This is virtually a summary of the more detailed information given by Sumner, Osburn, and Cole ('11). It is interesting to

note that the *Tethys willcoxi* collected on October 11, 1906 was taken from a lobster pot in the vicinity of Woods Hole.

Although no species of the genus *Tethys* had been found to 1895 along the Massachusetts and Rhode Island coasts according to the comprehensive records of Gould and Binney ('70), Verrill ('82), and Pilsbry ('95), it is quite likely that members of the group have appeared in these waters rarely and in small numbers but have not been made a matter of record. A fair estimate in instances of this kind is that not more than 1 percent of a wandering population is captured and brought to the attention of either the public or interested biologists. If this be true, it is by no means certain that all of the Aplysiidae found in Rhode Island waters are *Tethys willcoxi*; there appears to be a good possibility that both *Tethys willcoxi perviridis* Pilsbry and *Tethys protea* Rang were collected but released by offshore trap fishermen. This would not be the first record for *Tethys willcoxi perviridis* in this area, since Johnson ('34) presents its distribution as "Southern Massachusetts, Rhode Island, and Cape May, N. J." It is of interest to note that with the possible exception of Coe's single specimen from Plum Island, N. Y., *Tethys* has not been recorded from the Gulf of Maine, Long Island Sound, or from the East Passage of Narragansett Bay.

Included below in Table 1 is a list of 22 individuals of *Tethys willcoxi* observed in the western passage of Narragansett Bay and outlying Rhode Island waters in 1949. Authenticated reports by trap fishermen and dredgers are included even though in most of these cases the animals were thrown back into the water or destroyed and could not be obtained for laboratory examination.

It is at once apparent, in Table 1, that there is a tremendous difference in individual size, but it is no greater variation than one would expect in a small random sample of a presumably large population. It is important, however, to note that five and possibly nine of these animals are very much larger than any previous measurement of this species. Heilprin ('86) lists the length as 7–8 inches, while Pilsbry ('96) indicates an average of 11–15 cm. More recent records come within this same range. The author has previously found *Tethys willcoxi* larger than the size range usually described, in Lemon Bay, Florida, and off

TABLE 1

Tethys willcoxi *Heilprin in Narragansett Bay and Other Rhode Island Waters During 1949*

Number of Specimens	Collection Date	Where Found	Length cm.	Height cm.	Width cm.	Shell cm.	Remarks
1	10/8	On fishnet south of Narragansett Pier, R. I.	12	5.7	7.5	5.8 × 4.4	Measured; preserved. Specimen at Department of Zoology, R. I. S. C.
1	10/11	By scalloper in Pt. Judith Pond	31.3	14.7	23.3	9.4 × 6.8	* Brought to Laboratory and kept alive in aerated salt-water aquarium for 17 days. Preserved at Department of Zoology, R. I. S. C.
4	10/16	Netting and purse of fish trap south of Narragansett Pier, R. I.	—	—	—	—	2 animals returned to ocean; 1 brought to Jerusalem, R. I., other to Snug Harbor—both destroyed.
1	10/18	Dragger about 10 miles SE of Point Judith	—	—	—	—	Accidentally destroyed on vessel while being brought back to port.
3	10/18	Dragger in Block Island Sound	—	—	—	—	Brought to Champlin's Fish Market at Galilee and kept alive in empty lobster display tank about a week, before being destroyed.
3	10/24	Washed up on beach at Saunderstown, R. I.	about 15 to 20 cm.	—	—	—	Laboratory notified too late to recover these animals.
1	10/25	As above	—	—	—	—	Specimen very mutilated when brought to Laboratory.
1	11/3	Lobster trap about 1½ miles south of Pt. Judith	17.2	8.7	10.3	5.9 × 4.3	Attempted to keep in Laboratory tank. Animal disintegrated before preservation.
2	11/20	Dragger east of Block Island Sound	20.8	9.5	12.9	6.2 × 4.8	Thrown overboard immediately after capture. Other in Department of Zoology, R. I. S. C.; measured dead but unpreserved.
5	11/20	On beach between tide lines on the west shore of Jamestown Island, South of Dutch Island	28.8 15 19.2	11.7 7.3 9.7	20.9 12.2 10.8	9.4 × 6.3 5.8 × 4.2 6.2 × 5.2	Measured dead but unpreserved; 3 specimens kept at Department of Zoology, R. I. S. C. 2 unmeasured, uncollected specimens described as "larger" than others.

* This specimen anesthetized, preserved, and then measured. Shrinkage negligible.

Shell Key in the Bay of Florida. In giving measurements of animals capable of as great contractility as the tectibranches, it is certainly advisable to indicate whether the measurements were made on living, preserved, or dead and unpreserved material, whether the animal was anesthetized before it was preserved, and approximately how long after preservation the measurements were made. There is often as much as 20 percent external shrinkage of this species when it is preserved unanesthetized in 10 percent formalin, whereas similar material put in the same solution after death shows very little dimensional change.

The specimens examined at the laboratory showed some structural variation from the diagnosis of this species by Pilsbry ('96), and the possibility exists that these larger animals may prove to be a new form of *Tethys*. The large, convex, smooth mantle in all cases had a nearly central minute tubular perforation; irregular delicate black rays radiating to the mantle edge were present only in the smallest specimen. The opaline gland, which is largest in the smallest specimen, opens behind the genital pore which is under the anterior right border of the mantle at the end of a slightly raised anteriorly curved tube. No filament was observed projecting from apex of penis.

Color in all the specimens observed alive was dark brown or very slightly maculated on the swimming lobes, head, and neck; and there were large, rounded, fairly regular yellowish scallopings along the inner border of the swimming lobes, the remainder of this area being very dark purple which was slightly lighter over the mantle. After being in 10 percent formalin for several weeks, the brown coloring disappeared on the lobes leaving them coarsely cloud-marbled except in the sinus between lobes and body, where dark brown still obtains; neck, head, and foot remained dark brown in the shrinkage reticulations, light brown to light purple elsewhere; mantle and gills purple; mantle cavity covered with small purple blotches on a pale yellow background; no green coloring has appeared yet on any of the preserved material. The smallest animal differed from the rest in preservative, in that its coloring has changed very little; the entire animal became lighter brown, and small dark brown spots appeared in a large central area of the outside of each swimming lobe. The

preserving fluid of these animals varies at present from straw color to reddish purple.

Tentacles are long in all of the material, but there is some variation in slit size. One small black eye is well anterior to each tentacle. The shell is typical except that the thin, slightly iridescent calcareous layer is not translucent.

There are definite indications in some of the more recent work in marine ecology and physical oceanography that the more important reasons for the sporadic appearance of tropic forms not indigenous to the New England Coast will soon be clarified. An unusual number of other southern forms appeared in the area under discussion in 1949, in relatively large numbers. Among these were *Hippocampus*, the sea horse; *Physalia*, the Portuguese man-of-war; *Lepas* and *Conchoderma*, the goose neck barnacles. (For past years, Sumner, Osburn, and Cole ('11) record members of the sargasso weed association as *Scyllea pelagica*, *Planes minutus*, etc. Fish ('25) lists southern planktonic forms in the Woods Hole area, among which are *Pontella pennata*, *P. meadii*, *Microsetella rosea*, *Setella gracilis*, *Thaumaleus claparedii*, etc.)

Although little has been written concerning the appearance of *Tethys* and other tropical forms in this area, it has been generally considered that when the prevailing southwest winds become unusually strong and last for a relatively long time during the late summer and early fall, an abundance of these subtropical animals will appear. Then in 1937, Merriman, writing about the presence of *Tethys* in this general area, advanced the view that

"... it is more likely that its infrequent occurrence in the region is best accounted for by the proximity of the Gulf Stream. Tropical forms in northern waters, but some distance away from the Woods Hole region ... [it is assumed] reached these latitudes with the aid of the Gulf Stream, and that they then immigrated by themselves through abnormally cold waters or were perhaps helped along by smaller currents, so that they eventually arrived in such a locality."

This assumption, made at a time when little observational data was at hand, may be substantiated by the recent work of Ketchum and Fuglister of the Woods Hole Oceanographic Institution.[1] In this investigation, the drift bottle technique was

[1] Personal communication from Martin J. Pollak, W. H. O. I.

used in trying to determine whether the Gulf Stream flowed north northeast in a straight line or whether small branches existed that reached the coast in this area. This work showed that, although the Gulf Stream has not been doing anything out of the ordinary recently, there are definite indications that bubbles of Sargasso Sea water may have been cut off by the meanderings of the Stream, thus finding their way into the slope and coastal water. In approaching the coast, other conditions apparently prevail.

". . . Our releases [drift bottles] were mainly made in the area off New York and, consequently, are not informative concerning the exchange with Long Island Sound or Narragansett Bay.

". . . The returns suggest that bottles released within five miles of shore reach the beach within a very few days of release. From some inshore stations, returns have been as much as 70%. From stations ten miles or more offshore the proportion of returns drops rapidly and the bottles released twenty miles from the nearest shore have very little chance of getting ashore. A substantial proportion of drift bottles released off New York have been returned from North Carolina. Combining the drift bottle results with hydrographic surveys one can construct a chart of 'most probable paths of drift.' These show that the water in the offing of New York Harbor is rotating in two or more anticyclonic eddies which shift in position at various times of the year. We interpret the fact that few returns are received from offshore releases as an indication that these bottles get into the general oceanic circulation. We have had a single return after 17 months) from Ireland. The number of returns from North Carolina area indicates that the southwesterly drift predominates along this section of the coast.

"None of the bottles which we have released off New York have been returned from the eastern end of Long Island Sound, etc. If there were any major water transport of Gulf Stream water into Narragansett Bay I would expect some of our bottles to show an indication of it." [2]

Thus the tropic planktonic forms together with the benthonic swimmers and weak pelagic swimmers would be carried to slope waters by offshoots of the Gulf Stream. These forms might eventually reach the coast, aided by the normally prevailing southwest winds and abnormally high temperatures. It is cer-

[2] Personal communication from Bostwick H. Ketchum, Woods Hole Oceanographic Institution.

tainly possible that additional year-round bottle releases may clarify the manner in which drifting marine forms reach this coast, although such a method would not account for the sporadic appearance of the strong swimmers in this area in late summer and early fall. It is suspected that in the latter case, the temperature factor together with the course taken by the natural food of these animals (in turn influenced by Gulf Stream branchings) is most responsible for their shoreward immigration. The same tendency would prevail in winter as in summer, but in this case lower littoral temperatures would decimate any of the animals straying from the environmental protection of the Gulf Stream.

Finally, it is pertinent to call attention to both Parr's ('33) and Hutchins' ('47) work on zonal typology and zonal distribution boundaries. These papers emphasize the facts that (a) the control of distribution of marine animals depends mainly on seasonal temperatures, and (b) organisms have definite zonal boundaries which can be related by means of summer and winter temperatures. The presence of *Tethys* in New England waters represents a special case since it cannot be considered typically migratory, planktonic, or sessile. Ketchum and Fuglister's experiments will certainly add more evidence in support of Hutchins' theory. This is an important consideration, especially for the marine ecologist.

Literature cited

Fish, C. J. 1925. Seasonal distribution of the plankton of the Woods Hole region. Bull Bur. Fish., **51**: 143.

Gould, A. A., and W. G. Binney. 1870. Report on the invertebrata of Massachusetts. 2nd ed. Wright and Potter, Boston.

Heilprin, A. 1886. A new species of *Aplysia*. Proc. Acad. Nat. Sci., Phila., 364.

Hutchins, L. W. 1947. The bases for temperature zonation in geographical distribution. Ecol. Mon., **17** (3) : 325–335.

Johnson, C. W. 1915. Fauna of New England 13. List of the Mollusca. Occ. Papers Boston Soc. Nat. Hist., **7**: 153–154.

——. 1934. List of marine Mollusca of the Atlantic coast from Labrador to Texas. Proc. Boston Soc. Nat. Hist., **40** (1) : 149.

Merriman, D. 1937. The occurrence of *Tethys willcoxi* in New England waters, and another record for this locality. Nautilus, **50** (3) : 95–97.

Parr, A. E. 1933. A geographical-ecological analysis of the seasonal changes in temperature conditions in shallow water along the Atlantic coast of the United States. Bull. Bingham Oceanogr. Coll., 4 (3) : 1–90.
Pilsbry, H. A. 1895. Manual of conchology, (Series 1), 16: 59–113.
Sanford, S. N. F. 1922. *Tethys willcoxi* in New England waters. Nautilus, 35 (3) : 80–82.
Sumner, F. B., R. C. Osburn, and L. J. Cole. 1911. A biological survey of the waters of Woods Hole and vicinty. Pt. II. Section III. A catalogue of the marine fauna. Bull. U. S. Bur. Fish., 31: 704.
Verrill, A. E. 1882. Catalogue of marine Mollusca added to the fauna of the New England region during the past ten years. Trans. Conn. Acad., 5: 447–587.

STUDIES ON MOLLUSK POPULATIONS: I.

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In taxonomic procedure it has been long since recognized that the giving of scientific names to individuals of a particular species is unjustified, even though the individuals may show some unusual and, possibly, even extreme development of some trait or traits which occur within the normal range of variation of that species. Since *Rensch* (1929) proposed the "Rassenkreis Prinzip" the trinomial system has been more generally adopted, but unfortunately often on an entirely erroneous basis. According to the ideas set forth in *Rensch*'s book a trinomial name should be used only for what might be called a geographically more or less segregated subspecies. This subspecies may very well be considered one of a possibly long series of intermediates between two distinct, although closely related species. Such series have been worked out most convincingly in various groups, notably among birds and mammals, more recently among reptiles and amphibians.

In investigations of the type necessary for this form of taxonomy large numbers of individuals must be studied for each species and from a number of localities. It is agreed that if a

group of individuals in one particular locality shows a certain trait, i.e., if the entire population possesses this particular trait, then that group belongs to a particular geographical race or it constitutes a subspecies. The same trait may occur, to be sure, in occasional or rare individuals of other geographically identifiable populations, as an exception. On the other hand, traits which are never encountered in an entire population or at least in the majority of individuals of a particular population, but which occur only in exceptional individuals of a number of different populations, are of no taxonomic value and their bearers should not be distinguished with a scientific name. This should hold true particularly if in a given population the trait in question may be observed in different individuals developed to a different extent.

If chance individuals have been made the "types" of new species or subspecies by taxonomists then the names must be relegated to synonymy, at least until a geographically definable variation is established.

It seems to the present writer that the mollusks offer an especially favorable material for studies in speciation since the problem of migration for the majority of species does not enter into the considerations. Since there is no migration (at least not in the post-larval stages), any trait or characteristic common to all individuals or a majority of them of a species in a particular population and not found, save as rare exceptions, in other populations, may, with confidence, be considered an endemism.

Traits, however, which may have been selected by taxonomists as of diagnostic value for separating what they may have considered subspecies or lesser taxonomic units from the typical species but which occur, even if only exceptionally or, perhaps, especially if they occur only exceptionally, in any group of individuals, should be classed as "of no taxonomic value" and the name given should be dropped.

It is conceded that for the serious amateur perhaps special names for variants may be attractive and of some curiosity value; but for the scientist they are cumbersome and superflous. In botanical taxonomy of a few decades ago the term *lusus naturae* or, simply, *lusus* was used to designate what German authors call a "Spielart." This German term implies a variation from the

common form due to pure chance since the word "Spiel" may mean game as well as gambling. The present writer proposes to relegate some gastropod names to synonymy, at the same time suggesting, however, to retain the names for the benefit of conchologists as *lusus*-names.

The first species in this planned series of studies is *Tegula gallina* (Forbes).

On June 20, 1948, an unselected group of *Tegula gallina* (Forbes) was collected at Dana Point, Orange County, California. In this lot there were: 564 specimens agreeing closely with the description of the typical form; 2 specimens with an open umbilicus, but otherwise like the typical form [= *Tegula gallina umbilicata* (Dall), 1919]; 12 specimens with a yellowish streak at the base and a yellowish-greenish-blackish color pattern on the shell [= *Tegula gallina tincta* (Hemphill), 1893]; one specimen with the color pattern of the typical form on the early whorls of the shell and the "*tincta*" pattern on the body whorl (unnamed); 3 specimens with the "*tincta*" coloring *and* an open umbilicus.

Among the 564 specimens considered here as "typical" *T. gallina* shells a great variation of the umbilical area was observed. Shells without any umbilical depression, shells with very shallow, with medium deep, and with very deep pits were noted. As no means for measuring the depth of the pits are available at present, subjective appraisal of the relative depths of the pits had to be used; this is, of course, variable even for the same observer on successive examinations of the same material; the counts, therefore, varied and are not given here. It is sufficient to state that the umbilicus of *Tegula gallina* (Forbes) may be lacking entirely, may be marked by a more or less deep pit, or may be open.

Collections of the same species were made at other points of the coast of southern California; similar observations have been made on a smaller group obtained at Palos Verdes Estates.

Through the kindness of Mr. John Hendrickson of the Museum of Vertebrate Zoology, University of California, the writer received 12 specimens of *Tegula gallina* collected on Guadalupe Island, Mexico, on January 31, 1950. These shells agree closely with the description of Stearns (1892) for *Tegula gallina multi-*

filosa from the same locality. It is interesting to note that it is very easy to pick out the shells from Guadalupe Island in general collections (such as that of the California Academy of Science, San Francisco). Among the 12 shells mentioned there are: 2 without trace of umbilical depression; 2 with very shallow pits; 7 with noticeable to pronounced pits; one with open umbilicus.

From the foregoing accounts it would seem permissible to conclude that *Tegula gallina* (Forbes) is a very variable form which has produced, apparently, one geographically identifiable subspecies on Guadalupe Island, recognized and described by Stearns; and a great number of variants occurring in various populations. Those variants of the latter type which have been given varietal or even subspecific names can be considered only as examples of the variability of the species and their names are herewith relegated to synonymy. The description of the species may be amended to read as follows:

TEGULA GALLINA (Forbes), 1850: Shell heavy, solid, conoidal, longitudinally striped or speckled with whitish, the stripes occupying the interstices between close, narrow, superficial folds of the surface, which may be well-marked or obsolete, continuous or cut into granules by equally close spiral furrows, the latter sometimes predominating; spire conoidal, the apex usually blunt, eroded, and yellow; body-whorl rounded at the periphery; base convex, more or less eroded in front of the aperture; whorls 5 to 6; aperture oblique; outer lip black-edged, smooth, and pearly within; columella short, arcuate, strongly bidentate near the base; *umbilical region may be marked by a shallow to deep pit or it may be entirely flat or the umbilicus may be a very narrow, deep opening* [lusus *umbilicata* (Dall), 1919]. The shell may vary in color and have the longitudinal markings and sculpture obsolete; if there is a yellow streak on the base and the color of the shell is yellowish-greenish or blackish, it may be called lusus *tincta* (Hemphill), 1893.

Tegula gallina multifilosa (Stearns), 1892, described from Guadalupe Island, Mexico, appears to be a valid subspecies, restricted in its distribution to that island.

LITERATURE CITED

DALL, W. H. Proc. U. S. Nat. Mus., vol. 56, no. 2295, August 30, 1919, p. 359.

FORBES, EDWARD. On the marine mollusca discovered during the voyages of the Herald and Pandora, by Capt. Kellett,

R.N., and Lieut. Wood, R.N., Proc. Zool. Soc. London, 1850 (Dec. 10), p. 271, pl. XI, fig. 8a, 8b.
HEMPHILL, H. In Oldroyd, Marine Shells of the West Coast of North American, vol. II, part 3, p. 777.
RENSCH, BERNHARD. Das Prinzip geographischer Rassenkreise und das Problem der Artbildung, Berlin, 1929.
STEARNS, R. E. C. Nautilus, vol. 6, no. 8, p. 351, pl. L, figs. 8, 9.

HOLOSPIRA KRIEGERI, NEW SPECIES, FROM TAMAULIPAS

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Early in May of 1949, Alex D. Krieger, Research Archaeologist, University of Texas, and Glen L. Evans, Assistant Director, TexasMemorial Museum, visited the scenes of recent archaeological investigations in the states of Tamaulipas and Vera Cruz. During this trip, Krieger collected nonmarine mollusk shells from sites in the two states and turned them over to the writer for his research in ethnoconchology then being done in the Department of Anthropology of the University of New Mexico. In the forms so far studied, the species of landsnail of the genus *Holospira* (family Urocoptidae), herein described, has been recognized as new.

During 1945 and 1946, Richard S. MacNeish, then of the University of Chicago Department of Anthropology, made an archaeological survey of much of Tamaulipas. A report has appeared in which MacNeish described, in general, some of the cave archaeology of the Canyon del Diablo in the Sierra de Tamaulipas where the new urocoptid was later collected by Krieger. In this preliminary report, MacNeish assigns an antiquity of around 1000 years back (or better) for some of the culturally stratified materials in one of the caves investigated by him in the Canyon del Diablo.[1] In the spring of 1949, MacNeish continued with the Sierra de Tamaulipas archaeological surveying and excavated in his cave site TMc 81 in the Canyon del Diablo, Tamaulipas.

[1] MacNeish, 1947, p. 3.

It was from the upper cultural level of this so designated site that Krieger collected the nonmarine shells containing the new urocoptid which is named in his honor.[2]

It is not surprising that nonmarine shells and other natural objects are found *in situ* in archaeological deposits in caves or rock shelters. Some mollusks are very apt to inhabit caves in limestone country; especially if such physiographic features have springs in them which afford humid conditions particularly favorable for landsnails. Others may be washed by cloudbursts or permanent running water down into caves from cliff or mesa top shell habitats above, and be worked into the deposit being built up at the time, along with soil, rocks, roof falls, guano, ash, etc. Small freshwater clam or snail shells may have come into a cave site by being dipped up into containers when water was obtained from nearby water bodies. Both land and freshwater shells could be carried into sites when they were clinging to foliage for later use, or driftwood to burn or work.

HOLOSPIRA KRIEGERI, **new species.** Plate 4, fig. 9.

Holotype: Shell small, pale brown, of pupoid shape, and with the last half of the last whorl solute. The nuclear whorls are well rounded and microscopically granulose. The succeeding whorls are moderately rounded, separated by a strongly impressed suture, and marked by decidedly retractive oblique axial ribs which are feebly developed on the early turns but increase in intensity with the increasing whorls. On the middle turns the axial ribs are about as wide as the spaces that separate them; on the later turns they are more distantly spaced, being only about half as wide as the intercoastal spaces on the last whorl. The last whorl is contracted basally. The outside of the parietal wall is marked by a groove on each side across which the axial ribs do not extend. The aperture is broadly ovate and pointed toward the junction of the outer and parietal wall. The peristome is pale brown, thickened, and reflected. The interior of the aperture is pale brown. The columella is solid with a strong twist which develops into a low rounded lamella a little posterior to the basal wall in the penultimate whorl. The basal wall in the same turn bears an indication of another fold while the middle of the parietal and labial wall bear another short, but much stronger, fold in the same whorl.

[2] Letter, dated 27 May 1949.

The holotype (U. S. National Museum Division of Mollusks, 601629) has 10 whorls and measures: length, 10 mm.; diameter of the middle whorls, 2 mm. It was collected on 7 May, 1949, by Alex D. Krieger, in the upper cultural level of site TMc 81, Canyon del Diablo, Sierra de Tamaulipas, Tamaulipas, Mexico.

Paratypes: Only two whole specimens (U. S. National Museum Division of Mollusks, 601648; Drake Molluscan Collection, 1480) were collected by Krieger. D. M. C. 1568 contains four fragmentary shells of *Holospira kriegeri* collected with the holotype.

Discussion: On the aperture of one paratype (D. M. C. 1480) there is a very slight suggestion of a projection a bit back from the edge of the horizontal margin. Such projections are moderately developed in the Texas species *Holospira goldfussi* (Menke),[3] and in *H. rehderi* Bartsch and *H. morelosensis* Bartsch [4] from the Mexican states of Puebla and Morelos, respectively. The general appearance of *H. kriegeri* resembles *H. goldfussi*, *H. rehderi*, and *H. morelosensis*. However, paratype D. M. C. 1480 more strongly resembles these three forms than does the holotype of *H. kriegeri*, as the former is of more slender shape. Thus, *Holospira kriegeri* is probably a species with considerable variation, as in practically all the urocoptids.

Acknowledgments: Sincere thanks go to Dr. Paul Bartsch (authority on the family Urocoptidae for over 45 years) of the Division of Mollusks, U. S. National Museum, who gave considerable help with the preparation of the description. Dr. Harald A. Rehder, Curator of the same Division, kindly arranged for the photographing of the holotype at the U. S. National Museum.

Literature cited

Bartsch, Paul, 1947, Notes on some Mexican urocoptid mollusks, with the description of new species. Washington Academy of Sciences, Journal, Vol. 37, pp. 284–288. Washington.

MacNeish, Richard S., 1947, A preliminary report on coastal Tamaulipas, Mexico. American Antiquity, Vol. 13, pp. 1–13. Menasha.

Pilsbry, Henry A., 1946, Land Mollusca of North America (north of Mexico). Vol. 2, Part 1. Academy of Natural Sciences of Philadelphia, Monographs, No. 3, Vol. 2, Part 1.

[3] Pilsbry, 1946, p. 116, figs. 1–3.

[4] Bartsch, 1947, pp. 287–288, figs. 2, 4.

LAND SNAILS FROM CLIFTY FALLS STATE PARK, JEFFERSON COUNTY, AND FROM VERSAILLES STATE PARK, RIPLEY COUNTY, INDIANA

By CLINTON J. BUSHEY

Taylor Univ., Upland, Indiana

In 1949 the Indiana Academy of Science met for their spring session at Clifty Falls State Park, on May 14th and 15th. I took advantage of the occasion to collect land snails in the park. There are a few records of snails collected in Jefferson County near Madison, which in some cases may supplement this list, but I have been unable to locate a list. I trust this list will be of use to conchologists.

Anguispira alternata carinata P. & R.
A. kochi (Pfeiffer)
Gastrocopta armifera (Say)
G. pentodon (Say)
Haplotrema concavum (Say)
Mesodon appressus (Say)
M. clausus (Say)
M. elevatus (Say)
M. inflectus (Say)
M. thyroidus (Say)
M. zaletus (Binney)
Mesomphix cupreus (Raf)
Mesomphix friabilis (W. G. B.)
M. vulgatus (H. B. Baker)
Pupoides albilabris (C. B. Ad.)
Retinella indentata (Say)
Stenotrema fraternum (Say)
S. hirsutum (Say)
S. stenotrema (Férussac)
Triodopsis albolabris (Say)
T. fraudulenta (Pilsbry)
T. notata (Deshayes)
Ventridens ligerus (Say)

Versailles State Park, Ripley County, Indiana

I had occasion on May 5th and 6th, 1950 to collect a few land snails in Versailles State Park. No claim is made of complete coverage, but I thought the list of those I found in the brief time allotted to me might be of interest. I am listing them alphabetically.

Allogona profunda (Say)
Auguispira alternata carinata (P. & R.)
A. kochi (Pfeiffer)
Deroceras gracile (Raf.)
Discus patulus (Desh.)
Euconulus chersinus (Say)
Gastrocopta armifera (Say)
G. contracta (Say)
G. tappaniana (C. B. Adams)

Haplotrema concavum (Say)
Hawaiia minuscula (Binn.)
Mesodon clausus (Say)
M. elevatus (Say)
M. inflectus (Say)
M. thyroidus (Say)
Mesodon zaletus (Say)
Mesomphix cupreus (Raf.)
M. friabilis (W. G. Binney)
Pupoides albilabris (C. B. Ad.)
Retinella indentata (Say)
Stenotrema fraternum (Say)
S. hirsutum (Say)
Strobilops affinis (Pils.)
S. labrinthica (Say)
Triodopsis albolabris (Say)
T. fraudulenta (Pilsbry)
T. notata (Deshayes)
T. tridentata (Say)
Ventridens ligerus (Say)
Zonitoides arboreus (Say)

PSEUDOSUBULINA, A GENUS NEW TO THE UNITED STATES

By H. A. PILSBRY

In the course of a collecting trip in 1936 to the Chisos Mountains in the Big Bend of the Rio Grande, Professor E. P. Cheatum found a few specimens of a small, slender land snail which turns out to be a new species of the Mexican genus *Pseudosubulina.* It gives me great pleasure to name this important "find" in his honor.

"It was found deep in moist humus which had collected in the cracks between rocks at the base of the cap rock of Casa Grande peak. The location was near the Big Bend National Park headquarters."

Pseudosubulina cheatumi, **new species.**

The imperforate, turrite shell is rather glossy, olive-buff, very slender, the diameter contained about four times in the length. The numerous whorls are convex, most strongly so immediately below the very deeply cut suture. The apex is rather large, obtuse, the first whorl smooth, the next closely and finely rib-striate; the following whorls have thread-like axial striae or riblets separated by intervals equal to or wider than the riblets. The aperture is ovate, the outer and basal margins of peristome thin. Columella is weakly concave, rather thick, with rounded face, and tapering downward, being very obliquely truncate at base.

Length 6.4 mm., diameter 1.5 mm. 9 whorls.
Length 5 mm., diameter 1.4 mm. 8½ whorls.
Length 5.2 mm., diameter 1.3 mm., 8½ whorls.

Casa Grande Peak, Chisos Mountains, Texas. Type 186649 ANSP.

This is the first *Pseudosubulina* to be found north of Mexico. It is rather closely similar in shape and sculpture to *P. borealis* Pils., from near Monterrey in the Mexican state of Nuevo Leon, but that tropical species is about double the size of this, with 12 whorls, and the columellar truncation is even less apparent than in *P. cheatumi*.

NOTES ON LAND SNAILS OF TEXAS

By H. A. PILSBRY

Mr. C. D. Orchard of San Antonio, Texas, has sent us a series of land shells collected by him in Texas, containing a new form of *Holospira* and other interesting species, some of them noticed here.

Holospira roemeri brevissima, **new subsp.** Pl. 4, figs. 1, 1a, 2.

The shell has the white color, the texture and the sigmoid curvature of the last whorl as in *H. roemeri* (Pfr.). It differs by being very much shorter, relatively wide, the diameter half of the length or more than half; with a much more shortly conic summit. Shape varying from cylindric to oval or often widest immediately below the terminal cone, tapering from there to the last whorl. Umbilicus either open or closed.

Length 9.1 mm., diameter 5.2 mm.; 10⅓ whorls. Type.

Texas: in drift debris of the Nueces River at Laguna Crossing, 18 miles northwest of Uvalde, on State Highway 55 (Rock Springs road). Type and paratypes 186650 ANSP.; specimens also in the collection of Mr. C. D. Orchard.

This is like *H. roemeri* in being very variable in size and proportions, extreme specimens measuring:

Length 10 mm., diameter 5.6 mm.; 9¾ whorls.
Length 10 mm., diameter 5 mm.; 11 whorls.
Length 6.4 mm., diameter 4.7 mm.; 8¾ whorls.

Since this peculiar form together with other land shells was taken by Mr. Orchard from drift debris of the river, its locality is only approximately known and further field work is needed. In all probability the holospiras in the river drift represent several or many populations. Whether *H.r. brevissima* occurs with the normal *H. roemeri* is still unknown, but I presume that it is from a different place. There were 35 specimens in the debris gathered.

Holospira roemeri (Pfr.) occurred with *H. r. brevissima* in the drift, very variable in size, but differing from *brevissima* in shape, the diameter always less than half of the length. Specimens measure:

Length 15.4 mm., diameter 4.5 mm.; 15 whorls.
Length 14.1 mm., diameter 4.4 mm.; 13½ whorls.
Length 12.3 mm., diameter 3.9 mm.; 13 whorls.
Length 11.6 mm., diameter 4.4 mm.; 12 whorls.
Length 9 mm., diameter 3.7 mm.; 10½ whorls.

Most specimens are 11 to 12.5 mm. long, the long and short examples measured being selected from a large number. Dr. Pfeiffer gave the size of the type of *H. roemeri* as 13 to 14 mm. long, 5½ mm. diameter, with 14 whorls. In the original publication he noticed a var. *B*, "minor, sursum ventricosior, anfr. 12, ultimo brevius soluto." 11 × 4 mm. This "variety," which has been named var. *minor* Cockerell, is merely a small specimen from the ordinary range of variation of the species at New Braunfels, the type locality.

H. roemeri was found by Mr. Orchard at the following localities not before recorded for it: Uvalde Co. at Garner State Park, and Laguna Crossing of Nueces River; Dieck's Ford, Guadalupe River, Kendal Co.; West Varda Creek, Sanderson Co.; Llano River 4 miles south of Junction, Kimball Co.; Bandera Co. 3 miles north of Helotes, and on the Medina River, Bandera.

Holospira goldfussi anacachensis Bartsch was taken at Laguna Crossing of the Nueces River, Uvalde Co., State Highway 55.

Holospira hamiltoni Dall was found 3 miles southeast of Hot Springs, International Park, Brewster Co.

Cecilioides aperta (Swains.) A single specimen was found in the Pecan Grove, Olmos Park, San Antonio. Another was taken on a sandspit of San Antonio River, a half mile west of State

Insane Asylum, Bexar Co. As these are the only records of the species in Texas it seems likely that it was introduced with tropical plants.

Cionella lubrica (Müll.) A single specimen was found in the debris of the Nueces River at Laguna Crossing, possibly washed from a Pleistocene deposit.

SOME NEW RECORDS FOR EXOTIC SLUGS IN THE UNITED STATES

C. BRUCE LEE

During the past two years the Mollusk Division of the Museum of Zoology, University of Michigan, has acquired a series of slugs through gifts and collecting. The acquisitions are noteworthy as most of them are exotic species from various parts of this country. Some of the records are most unusual and are recorded below.

Limax marginatus Müller

Collected in Richmond, Henrico County, Virginia, in August 1948 by C. Bruce Lee. Dissection of specimens revealed the characteristic terminal appendage of the penis as mentioned by Pilsbry (1948). In the drowning process neither of the specimens collected showed any tendency to constrict off the posterior portion of the body as noted by Gregg (1941). Aside from a record for Newfoundland and another from Missouri, this appears to be the only other eastern record.

Arion subfuscus Draparnaud

In May, 1950, Mrs. Margaret Teare collected this species at Williamsville, Erie County, New York. Additional specimens from West Seneca, Erie County, New York, were sent in recently by Mrs. Margaret Teskey. These records are in addition to that of Mrs. H. R. Robertson (1941). It appears that this slug is more widely spread in western New York than is generally known.

ARION HORTENSIS Férusac

Mrs. Margaret Teare collected this species from her garden on Lafayette Avenue, Buffalo, Erie County, New York. The nine specimens were characteristically smaller than the previous species and showed the dark slate color and the orange sole and mucous. Dissection indicated the genitalia agrees with Germain (1930) and Pilsbry (1948). Although recorded by La Rocque (1938) from Toronto, Ontario, Canada, this is the first record of the species for western New York. A diligent search failed to turn up further specimens in the immediate vicinity.

TESTACELLA SCUTULA Sowerby

One specimen was sent in by Dr. Helen Ward of the Zoology Department of the University of Tennessee at Knoxville. Dr. Ward found the animal crawling on the campus. According to her communication it was a bright yellow. The small shell at the posterior part of the animal agrees in size, sculpture, shape and apical character with the description of the species listed by Germain (1930). Pilsbry (1946) considers the genus *Testacella*, in America, as restricted to greenhouses. All of his listings are from such places. In addition to the above record from Tennessee, the author recalls a specimen of *Testacella haliotidea* Drap. sent to our museum by Dr. C. J. D. Brown in 1947 who collected it on the grounds of the Old United States Fish Hatchery at Clackamas, Clackamas Co., Oregon. It was identified by Dr. Aurèle La Rocque.

LITERATURE CITED

GERMAIN, LOUIS. 1930. Faune de France, Mollusques Terrestres et Fluviatiles, première partie 21: 77–78; 115–123.

LA ROCQUE, AURÈLE. 1940. Checklist of Canadian Mollusca (manuscript), p. 290.

PILSBRY, HENRY A. 1946. Land Mollusca of North America (North of Mexico) Monographs Number 3, Vol. II, Part 1: 230–231.

——. 1948. Op. cit. Vol. II, Part 2: 529–532; 666–673.

NEW MEXICAN AND PANAMIC SHELLS

By MAXWELL SMITH

Euglandina bailyi, **new species.** Plate 4, fig. 11.

Shell thin, very slender, slowly tapering above; color pale yellowish brown, slightly shining with a silk-like lustre, apical whorls more lustrous. Sutures slightly impressed, somewhat undulating, longitudinal sinuous ribs barely extending over sutures, these ribs numerous, fine, crossed by infrequent faint spiral riblets. Spire long, apex obtuse, whorls 7½, slightly convex. Aperture about ½ length of shell, narrow above, broad below. Columella area gracefully curved, strongly truncated below. Length of shell 68 mm., width 22.5 mm. Type in writers collection.

Habitat: Close to highway, 3 miles east of Chilpanzingo, State of Guerrero, Mexico.

A single fresh example of this distinct new species was collected by the writer in June 1948, about six hours being spent at the locality. The new *Euglandina* occurred with *E. liebmanni* Pfr. which lives here in abundance underneath scattered loose limestone outcrops. Scorpions were more plentiful than snails at this station.

The species is named for Dr. Joshua L. Baily of San Diego, California. It differs from *liebmanni* in being a much narrower shell with higher spire and decidedly finer sculpture. From *E. michoacanensis* Pilsbry it may be separated by the more slender shell and lack of the conspicuous extremities of the longitudinal ribs at the sutures, so characteristic of that species. Incidentally the writer procured a fine living specimen of *E. michoacanensis* Pilsbry in deep woods a few miles below the Desierto de los Leones, elevation around 9,000 feet, near the Mexico City Highway. Nearby at the roadside under bushes live *Humboldtiana buffoniana* Pfr. and upon pine trunks *Drymaeus sulcosus* Pfr.

Polinices (mammilla) clarki, **new species.** Plate 4, figs. 7, 7a.

Shell solid, spire short, whorls 4, sutures distinct. Aperture large. Columella decidedly oblique, callus extending only partially across the umbilical area, forming a convex extended area in the center, outer labrum thin in the two present examples. Interior and middle callus area chocolate-brown in color. Externally the spiral broken bands suggest certain forms of *Hydatina*. Length of shell 31 mm., width 26 mm. Type in writers collection.

Habitat: Panama (Pacific Ocean).

This shell differs from the well known *Polinices* (*Mammilla*) *melanostoma* in the entirely different disposition of the callus, the more oblique columella, more impressed sutures and different external sculpture. It is dedicated to its discoverer Walter D. Clark.

MARGINELLA HILLI, **new species.** Plate 4, fig. 6.

Shell solid, spire elevated, apical whorls covered with enamel. Sutures bordered by a chocolate-brown band. Growth lines distinct, crossed anteriorally by a few grayish colored bands on outside of shell. Aperture narrow, increasing slightly in width below; five distinct columella plaits, interior of outer labrum with numerous small denticles. Anterior canal obliquely extended outside. Labrum well thickened, externally colored longitudinally with yellow-brown, the same coloring present also beyond the columellar callus. Length 15 mm., width 10 mm. Type in writers collection.

Habitat: Chamela Bay, Pacific coast of Mexico.

According to Beebe's "The Book of Bays" Chamela Bay lies between the better known Banderas Bay and Tenacatita Bay. *Marginella hilli* is a compact and attractive little shell. It is named for Howard R. Hill, of the Los Angeles Museum, California.

DANIEL LITTLEFIELD EMERY

BY WILLIAM G. FARGO

Daniel Littlefield Emery, born March 28, 1861, at Wells, Maine, died in St. Petersburg, Florida, April 11, 1950. The earlier years of his manhood were spent in New England, where, starting as a machinist, he became assistant superintendent of the Whittenton Cotton Mills of Taunton, Massachusetts. He was employed also in mills at Fall River, Massachusetts, and later in Tiverton, Rhode Island. In 1901 he went to Arizona and in 1902 to California where he held supervisory mechanical positions in San Jose, San Francisco and San Diego. Emery was tall and vigorous with a constitution that enabled him to carry on actively into the later of his 89 years.

Mr. Emery was married to Lydia Mason in 1880, at Warren, Rhode Island. Both she and their son, Charles, are dead; a

grand-daughter, Mrs. Charlotte Wiegle, resides in San Diego, California. In 1926, Mr. Emery married Mrs. Frances S. Ellefson who survives him. Since his death she has gone to live with her daughter, Mrs. Leonard C. Reid, in Chicago. Emery P. Chace, the well known conchologist of Lomita, California, is a nephew.

Emery first began collecting shells in 1910 and with his customary attention to detail and love of accuracy he soon made far more of this pursuit than do many collectors. He had a good educational background, not all acquired in schools, for he was a natural student and a keen observer of things out of doors as well as in. He possessed a remarkable memory from which he would unhestitatingly quote at length from the classics and otherwise. He moved to St. Petersburg, Florida, in 1916.

Over a period of thirty years he corresponded with leading amateur and professional conchologists, keeping systematic files, each being given a serial number; these running to over 125 names. He made several trips to Cuba and also visited the Bahamas. In 1941 the Emery world-wide shell collection, about 6500 lots, was merged with the Edna Gordon-H. B. Archer collections in St. Petersburg. In 1949 these combined collections were presented by Mr. Archer to the City of St. Petersburg, which at this writing is completing a new and well built public museum building on the Tampa Bay front.

Beginning with duplicates reserved, Mr. Emery started a new shell collection, limited to North American species, which at the time of his death comprised some 2700 lots. Of these about 2000 are marine. This collection has been acquired by the University of Michigan Museum of Zoology. For many years president of the St. Petersburg Shell Club, Mr. Emery gave much time to helping beginners in the study of mollusks and always was generous with duplicate specimens. He was socially inclined, and radiated good cheer wherever he went. He derived much satisfaction in attending annual meetings of the American Malacological Union, including that of 1947 in California. His portrait presented herewith, was taken in California, June, 1947. At that time he was past eighty-six.

OLOF O. NYLANDER
1864–1943

By PERCY E. RAYMOND

Olof Nylander, naturalist, collector and amateur scientist, died at Caribou, Maine, on July 29, 1943, after 79 years of a useful, and happy life.

Nylander was born on June 14, 1864 at Ysted, Sweden, the son of a shoemaker. In his boyhood he was a pupil and protege of the Swedish geologist, Sven Nillson, who encouraged and directed his youthful enthusiasm for natural history. Lacking funds, he never had a formal education. In fact, he never mastered the English language. The writer treasures the many letters he received from Olof, gems of Swedish-American dialect and impromptu spelling.

At sixteen he came to America, where two older brothers were already established. For several years he worked as a house-painter in New England, New York and Florida. But his odd hours during this period were devoted to collecting shells, fossils and plants and to visiting museums. Eventually he settled down at Caribou, Maine, to be near his brother, Jacob. From that center he led a wandering life, traveling on foot or by canoe through the forests of northern and eastern Maine, collecting snails, plants and fossils. A large part of what we know of the fossils of the Devonian of Maine is due to Nylander who sent his collections to H. S. Williams and John M. Clarke. Neither of these paleontologists ever saw much, if anything, of the strata in which the species they described were found, but each produced an extensive monograph on the basis of Nylander's fossils.

Later in life, he supported himself by collecting and raising ferns for commercial purposes, but a forest fire ruined his plantation and his last years were spent partly as a consulting geologist and partly as Curator of the Nylander Museum at Caribou. He was still active and enthusiastic until a few hours before his death.

Nylander's contributions to paleontology were numerous and he did much for conchology and botany. But he was personally known to relatively few people, mostly those who were indebted to him. His name will be perpetuated by the specific names,

Phacopodella nylanderi Clarke, *Prorensseleria nylanderi* Raymond, *Macroporaster nylanderi* Raymond, and various species of living snails.

No attempt will be made to include a complete bibliography of Nylander's writings, for many of his contributions were published in newspapers, not commonly available. Toward the end of his life he issued a series of mimeographed pamphlets, some of which are listed below. The following titles give a sample of his various interests.

Distribution of *Limnaea emarginata* Say and Var. *mighelsi* Binney, in Fish River, Aroostook Co., Maine, 1901. Privately printed. (Illustrated with three plates of excellent drawings by Nylander.)

The Geology and Poseidon Bulls. of the Madawaska Lakes. August, 1936. (Mimeographed.)

Graptolites of Aroostook County, Maine. Dec. 1936. (Mimeographed.)

A Reconnaissance of the Head Waters of Fish River, Aroostook County, Maine. May, 1937. (Mimeographed.)

Geological Formation of Square Lake, on Fish River, Aroostook County, Maine. Jan. 1938. (Mimeographed.)

Geological Formations of the St. John River Valley, Northern Maine and New Brunswick. 1940. (Picture of Nylander on cover.) (Mimeographed.)

History of the Discovery of the Chapman Sandstone in Aroostook County, Maine. Presque Isle Star-Herald, Thursday, Oct. 23, 1941.

Nylander also published many papers on recent snails, chiefly in The Nautilus, between 1895 when he wrote on the shells of Aroostook County, Maine, and 1943, the year of his death.

So far as I know, Nylander never described a new species of fossil. His principal idea was to help others and he certainly did advance knowledge of the geology of northern Maine. Some of his ideas of the subject were naive and he felt that certain people had not really appreciated his efforts in their behalf. But he was a good-hearted, generous, hardworking soul, plowing and plodding his way through the northern wilderness with no other thought than to keep himself alive and add to scientific knowledge.

THE AMERICAN MALACOLOGICAL UNION, SIXTEENTH ANNUAL MEETING

By MARGARET C. TESKEY

The Chicago Natural History Museum offered a warm welcome and good meeting facilities, the weatherman provided fair weather, and Dr. Fritz Haas, president and host, made it possible for the A.M.U. to enjoy one of the best meetings since the war.

Members and friends from ten states, the District of Columbia, and three other countries signed the register and assembled at 1:00 P.M. on Wednesday, June 14th, for the first session of the 1950 convention.

A brief welcoming address by Dr. Fritz Haas, the welcome seconded by Colonel Clifford C. Gregg, Director of the museum, and answered by Dr. Paul Bartsch, got the meeting under way. Dr. Howard K. Gloyd, Director of the Chicago Academy of Arts and Sciences, spoke briefly of the late Frank Collins Baker. A condensed report of the council meeting, held earlier in the day, was presented with nominations for officers who were unanimously elected as follows: President, Dr. Joseph P. E. Morrison; Vice-President, Dr. Jeanne Schwengel; Treasurer, Harold R. Robertson; Secretary, Mrs. Harold R. Robertson; Councillors-at-Large, Dr. Carlos G. Aguayo, Dr. Joseph C. Bequaert, Dr. G. Dallas Hanna, Dr. A. Bryon Leonard. Dr. Leo Hertlein, Chairman of A.M.U.P., becomes 2nd Vice-President. Dr. Henry van der Schalie reported briefly on THE NAUTILUS index, now complete and ready for the printer. The Council authorized him to investigate printing costs, and tentatively guaranteed limited financial backing from the A.M.U. treasury in the event that it should be needed. An invitation to hold the 1951 meeting in the Buffalo Museum of Science, Buffalo, N. Y., was unanimously accepted.

The following papers completed the afternoon program: "American Ellobiidae," by Dr. Joseph P. E. Morrison; "A Trip Along the Great Falls of the Potomac," by Gordon K. MacMillan; "The Mollusks Inhabiting Temporary Pools and Ponds in Ohio and Illinois," by Dr. Ralph W. Dexter; "Remarks on the late Dr. Carlos de la Torre," by Dr. Paul Bartsch.

At 7:00 P.M. the assemblage gathered in a private dining room on the tenth floor of the Stevens Building for the annual banquet. It was a festive affair, for the setting was pleasing, the service excellent, and the food delicious. Dr. Bartsch acted as toastmaster, and after requesting a moment of silence in respect for our three fellow-members departed from this life since the last meeting, Dr. Carlos de la Torre, Mr. Dan L. Emery, and Dr. T. C. Stephens, he called upon Drs. Fritz Haas, Joseph P. E. Morrison, Jeanne Schwengel, Henry A. Pilsbry, Harley J. Van Cleave, Elmer G. Berry, and Henry van der Schalie, who replied with anecdote and reminiscence, thus capping a most enjoyable evening.

Routine announcements opened the second day's sessions followed by reading of a wire from the absent and sadly missed Mr. and Mrs. Harold R. Robertson, and a message from R. Tucker Abbott, who sent greetings from Zanzibar.

Papers completing this morning session were as follows: "Notes on Leucochloridium" by Dr. Irving Kagan and delivered by Dr. Henry van der Schalie; "Notes on the Ecology of Stenotrema hirsutum," by Charles Bruce Lee; "Molluscan Faunas and Climatic Changes in the High Plains Province," by Dr. A. Byron Leonard; "The Pearly Mussels of the Marais des Cygnes River of Kansas," by Robert W. Reese.

Lunch in the museum cafeteria was followed by a muster on the steps of the museum, at which time group pictures were taken, then back to the meeting room on the second floor where the following papers completed the academic part of the convention: "Columellar Armature of Cuban Urocoptid Land Shells," by Dr. Paul Bartsch; "Method of Raising Snails at the National Institute of Health," by Elmer G. Berry.

Since the final session had been brief, the hours gained were utilized in becoming better acquainted with the great museum whose hospitality had been so much enjoyed, the nearby Shedd Aquarium, and the Chicago Academy of Arts and Sciences.

At an early evening hour the group gathered in one of the beautiful ballrooms of the Stevens Hotel to enjoy the hospitality of Dr. Jeanne Schwengel and her husband, General Frank R. Schwengel, at another of their famous cocktail and buffet supper parties, delightful as always.

Eight molluscan zealots made up the party for the field trip on Friday, led by Dr. Haas. The trip was made by train to the Indiana Dunes, some forty miles east of Chicago, and although no actual collecting was allowed in the immediate area which is a state park and thereby restricted, many terrestrial and aquatic species were observed, and it was a most enjoyable outing.

And so ended the sixteenth annual meeting of the American Malacological Union, with much credit due Dr. Haas for making it such a successful one. On to Buffalo in 1951!

NOTES AND NEWS

Mesodon appressus form sculptior Chadwick in Maryland. —A small colony of *Mesodon appressus* form *sculptior* Chadw. was recently found in the cemetery adjoining Christ Church, Cambridge, Maryland. The shells run rather small, being from 13.5 to 14.5 mm. in diameter. A few years ago a single broken specimen was found in river drift near Whitehall Creek, Choptank River, Maryland, but the present record of living material is the first for the Eastern Shore of Maryland. *Anguispira alternata fergusoni* Bld. and *Triodopsis albolabris* Say were found associated with the *M. appressus*.—Ralph W. Jackson.

The distribution of Triodopsis soelneri (J. B. Henderson) in North Carolina.—Since its description in 1907, *Triodopsis soelneri* has not been reported from any place other than the type locality, in a cypress swamp on the north shore of Lake Waccamaw, Columbus Co., North Carolina. During the spring of 1950 I made two collecting trips to coastal North Carolina where I found this species at four localities, which indicates that it has a wide range in this area. The localities are: Jones Co.: edge of swamp, roadside, and pine woods, 2 miles north of Pollocksville. Brunswick Co.: pine woods, 1.8 miles west-northwest of Shallotte; Wet Ash Swamp, 2 miles southeast of Ash. Columbus Co.: pine woods, 1.3 miles west of Evergreen. Specimens from the pine woods differ from the typical form of the cypress swamps in being smaller, and in having a small but distinct denticle on the outer lip.—Leslie Hubricht.

THE GENOTYPE OF PLOTIA "BOLTEN" ROEDING.—In the April number of the Archiv für Molluskenkunde (Bd. 79, Nr. ⅓), Dr. Lothar Forcart discussed this genus (pp. 77, 78), designating as its type *Plotia minuta* Bolten, which is a synonym of *Nerita tuberculata* Müller. *Plotia* Roeding, 1798, as understood by Forcart, would therefore displace *Melanoides* Olivier, 1804, which has the same species of Müller as type.

Plotia originally contained 15 species. Five of them are *nomina nuda*; the remainder belong to five genera now referred to four wholly unrelated families. To get rid of the name in the nomenclature of melanians, where it had been used incorrectly by Brot and others, Pilsbry and Bequaert (NAUTILUS, 37:36, July, 1923) designated *Plotia lineata* Roeding as the genotype of *Plotia*. This species is synonymous with *Pyramidella dolabrata* (L.) This type selection was apparently overlooked by Forcart, for it eliminated the name *Plotia* from the Thiaridae (Melaniidae).—PILSBRY.

HELISOMA ANCEPS (MENKE), 1830.—This long forgotten name for the common *Planorbis bicarinatus* Say, 1819 (not *Planorbis bicarinatus* Lamarck, 1804), was disinterred by me some years ago (1934, Proc. Acad. Nat. Sci. Phila., 86: 45) to serve as a substitute for Say's homonymous term. It was published as *Planorbis anceps* by Menke in his Synopsis Methodica Molluscorum . . . in Mus. Menkeano, edit. altera, p. 36, 1830, based upon Lister, pl. 139, fig. 44. This substitution has been accepted by F. C. Baker in his volume on Planorbidae and by other authors, but Prof. A. B. Leonard in a recent paper seeks to discredit it as "unrecognizable." A photographic copy of Lister's figure is reproduced slightly enlarged in Plate 4, fig. 44, so that those who do not have ready access to Lister's folio may judge. If it is not *bicarinatus* Say, I do not know any other Virginian species Lister's copperplate could represent.—PILSBRY.

THE PLATE HEADINGS OF BRUGUIÈRE.—In the concluding installment of a translation of Lamarck's "Prodrome d'une nouvelle classification des coquilles" (NAUTILUS, Vol. 61, pp. 134–143, April, 1948), I treated the names of several of Bruguière's pelecypod genera as *nomina nuda* because these genera were never

described by him, but were merely utilized as headings for plates of figures of unnamed species. The plates appeared in the Encyclopédie Méthodique in 1797, five years after Bruguière's death, and it is not even certain that Bruguière had even seen them or supervised their preparation. The reasons for my view that the names in question were *nomina nuda* are discussed in another paper.[1]

Although these names have been frequently attributed to Bruguière, the conclusion seems to me inescapable that, as of the date of the submission of my manuscript to THE NAUTILUS, they should have been considered as improperly used as of Bruguière, under the terms of Rule 25 of the Code and Opinion 1 of the International Commission on Zoological Nomenclature.

The Commission, however, has adopted an Opinion, as yet unpublished, since the date when the above-mentioned papers were submitted for publication, which validates these names as of the respective dates of the publication of the plates, by expanding the construction of the word "indication" in Rule 25 and Opinion 1 to cover this case.

Without commenting at length upon the wisdom of the Commission's action (which seems at least debatable, in that it approves a further breaking-down of the wise limits placed upon the meaning of the words "publication" and "indication" in Rule 25) it is now a part of the interpretation of the Rule, although it will not become binding upon zoologists until it has been approved, and thus ratified, by the International Congress.[2] —HENRY DODGE.

THE NAME HEMISINUS (LONGIVERENA) AVUS Pilsbry, 1944, Proc. Acad. Nat. Sci. Phila., **96**: 145, is preoccupied, as Dr. Morrison kindly informed me, by *Hemisinus* (*Verena*) *avus* Pilsbry and Olsson, 1935, same Proceedings, **87**: 15. The species of 1944 may be called *Hemisinus palaeus*.—H. A. PILSBRY.

WENDELL P. WOODRING, of the U. S. Geological Survey, has been awarded the Penrose Medal of the Geological Society of

[1] The molluscan genera of Bruguière, Journal of Paleontology, Vol. 21, No. 5, pp. 484–492, Sept. 1947.

[2] See Haas, Journal of Paleontology, Vol. 22, p. 641, Sept. 1948.

America. Dr. Woodring was honored for his researches in the West Indies and Central and South America.

More on the status of Vallonia excentrica Sterki.—Drs. I. and B. Rensch (1932) attack the validity of this species on two grounds: first, as Mr. Leslie Hubricht wrote in the Nautilus (64:35), that *excentrica*-like individuals can be found in a *V. costata* series as well as in a *pulchella* series, thereby making of Sterki's species a form of *V. pulchella*, probably resulting from "a single gene mutation which occurs throughout the genus" (l.c.). Secondly the Rensches point out that a large series of *pulchella* will usually show a few *excentricas*, then a preponderent group of specimens that can only be called transitional (intermediär) in all possible stages, and finally a relatively few specimens that are indisputably *pulchella*. (Sitzungsberichte der Gesellschaft naturforschender Freunde, March 1, 1932, p. 293). My own experience, after having examined large numbers of Vallonias from several localities within New York City (but not from the type locality of *V. excentrica*, Staten Island), tends to confirm the observations of the Rensches. As far as I am concerned, it is not true that "the two forms [*pulchella* and *excentrica*] can be separated with only a very small residue of doubtful specimens" (Naut., l.c.). I am happy when I can find *one* specimen that is clearly either the one or the other. Everytime I look at them I change my mind. I shall recommend that New York Shell Club drop *V. excentrica* as a valid species from the revised list of the molluscan fauna of the environs of New York. —Morris K. Jacobson.

McGill University Museums. Through the generosity of Mr. Lovell G. Mickles of Montreal, the molluscan collections of the Redpath Museum, McGill University, are undergoing a reorganization. The collections consist mainly of the extensive Carpenter Collection (of some 500,000 specimens) which not only contains finely preserved shells from all over the world, but includes numerous types (see Nautilus, vol. 58, No. 3, 1945, pp. 97–102). The work is under the direction of Dr. Katherine V. W. Palmer assisted by Vincent Condé of the Cardenas Museum, Cuba.—J. D. Cleghorn, Curator of Zoology.

PUBLICATIONS RECEIVED

THE WESTERN ATLANTIC MARINE MOLLUSKS DESCRIBED BY C. B. ADAMS. By William J. Clench and Ruth D. Turner. 171 pages, 20 plates. One of the serious handicaps for all workers on the marine mollusks of tropical America has been the identification of a great many unfigured species described about a hundred years ago by Professor C. B. Adams. A few of them have been figured by Reeve, Dall and others, but most of them remained known by the descriptions only. In this work, published as Number 15 of the "Occasional Papers on Mollusks," the original descriptions of Adams are reprinted and types or specimens considered lectotypes of nearly all species are figured. A few have been lost. Notes on some species by Krebs and others have been added. The status of many of the species and their modern generic allocation still remain to be worked out.

The value of this series of figures and the reprints of rare papers will be apparent. It is an indispensible book for all concerned with the Gulf and Caribbean faunas.—H. A. P.

A YARMOUTHIAN MOLLUSCAN FAUNA IN THE MID-CONTINENTAL REGION OF THE UNITED STATES (Univ. of Kansas Paleontological Contributions, Mollusca, Art. 3. 1950). By A. Byron Leonard. This paper of 48 pages, 6 plates, is a comprehensive account of a Pleistocene inland fauna. Some 65 species from 20 localities in northwestern Iowa, Nebraska, Kansas, Oklahoma and northwestern Texas are described and illustrated. Eight terrestrial and nine aquatic species are thought to be extinct. The illustrations are from photographs. Most of the species are small or minute, and the author is to be congratulated on his success in producing such excellent figures. It is inferred that the region was better supplied with permanent water in Yarmouthian times than at present, and the temperature was probably not much if any lower than now, though probably more equable. Forest genera are entirely lacking. The molluscan fauna has been declining since Yarmouthian times; thus, the Recent fauna of Meade and Clark counties Kansas, includes 21 species, whereas the Yarmouthian fauna of the same area totals 45 species. Misprints are rare, but we may note that throughout, *Hawaiia minuscula* is

misspelled "*miniscula,*" and on plate 4 the figures of *Stenotrema monodon* are reversed.—H. A. P.

Studies of the nonmarine mollusca of Yucatan. By Harold W. Harry. (Occ. Papers Mus. Zool. Univ. Michigan No. 524) 34 pp., text figures. A list of snails collected by the author in a brief visit to the region of Progreso to Merida and Chichen Itzá. There are copious notes on the species and their living conditions.

Results of the Catherwood-Chaplin West Indies expedition, 1948, part 4. Land snails of North Cat Cay (Bahamas), Cayo Largo (Cuba), Grand Cayman, St. Andrews and Old Providence. By Charles B. Wurtz. (Proc. Acad. Nat. Sci. Phila. 102:95–110, 1 plate.) Interesting additions are made to the land snail faunas of all of these small and rarely visited islands. Two new *Cerion* are described from Cayo Largo, and new species of the genera *Varicella* (2), *Lacteoluna* and *Microceramus* were taken on Grand Cayman.—H. A. P.

The molluscan fauna of the Cocos-Keeling islands, Indian Ocean. By R. Tucker Abbott. (Bull. Raffles Mus., Singapore, No. 22, 1950). Of 164 species reported from these atolls, five are land mollusks, one, *Succinea keelingensis* Abbott, a new species, being the only endemic; the others apparently introduced. The marine species "are a mixture of the typical Indian Ocean fauna and that of the western Pacific." The nomenclature and the synonymy given in some involved cases show careful work.—H. A. P.

Mollusks from the West Coast of Mexico and Central America, Part VII. By Leo George Hertlein and A. M. Strong. (Zoologica 34: 63–98, 1 plate, 1949). This series has reached the family Tellinidae. Keys to genera and species are given. New species of *Tellina* and *Macoma* are described. A valuable feature of these papers is that all related species of the coast covered are critically compared.—H.A.P.

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INTERESTING SHELLS FROM THE DELMARVA PENINSULA

By BERNADINE BARKER BAKER

During the latter half of June 1950, my husband and I spent a combined vacation and collecting trip at Accomac, Virginia, on the Delmarva Peninsula. The peninsula, as its name suggests, is made up of parts of the States of Delaware, Maryland, and Virginia, and forms the outer boundary of Chesapeake Bay. The area in Virginia where all collecting was done is Pleistocene sand, about half covered with pine barrens, with the remainder used for farming. At the time we were there, early potatoes were being harvested as well as snap beans. Tomatoes, and sweet potatoes were also noted in quantity. Besides agriculture, the peninsula is widely known as a fishing, crabbing, and oyster center. Of course we were mainly interested in the latter, and we made some of our most interesting finds from the heaps of discarded oyster shells. Considering that we were warned beforehand and told repeatedly that there were no shells to be found thereabouts, we found our trip singularly rewarding. At the close of this paper is a list of the mollusks noted in the various collecting spots.

(1). Folly Creek, Accomac. "Creek" is the term locally used for any long narrow arm of the sea or bay. These are affected by the tides, and may be somewhat brackish. At the branch of Folly Creek which we visited, we found a great number of oyster discards. Near by in three bushel baskets were very nicely collected for us the largest examples of *Urosalpinx cinereus* we had ever seen. The majority were from 1¾ inches to 2 inches high; the largest one (Pl. 5, fig. 4) being 51.2 mm. high by 24.1 mm. greatest diameter. They surely must have had optimum growing conditions. We also found some large *Eupleura caudata* shells, but these were relatively scarce here. Col-

lecting along the creek bank in the mud we pulled up very large *Modiolus demissus plicatulus,* the largest over 115. 5 mm. greatest measurement (over 4½ inches). Very large *Littorina irrorata* were also picked up, the largest measuring 29.2 mm. (over 1⅛ inches), with major diameter 19.1 mm.

(2). Onancock Creek, Onancock. On the bay side, this creek showed marked differences from the previous locality. We collected at two different places here: Finney's Wharf and East Point. The latter is a swimming spot, with sandy bottom, and has been somewhat disturbed by the dredging of a channel so that boats may come in to the wharf. *Tagelus gibbus* was noted here in great quantity. *Littorina irrorata* was markedly smaller than the specimens collected in Folly Creek. Among the small mollusks crawling on the bottom, we noted young *Ilyanassa obsoleta.* Unlike the adults, these have a complete spire. Deep Creek, where large specimens of *Mytilus recurvus* were found with the oyster discards, was similar to Onancock Creek.

(3). Kiptopeke Beach, near Cape Charles. This long stretch of sandy beach along Chesapeake Bay near the tip of the peninsula yielded one of the most interesting finds of the entire trip. A half mile out in the water we noted trap nets, and as we came opposite these on the beach, we found many specimens of *Busycon carica.* They were unusual for two reasons: their bright orange lining, and their retention of entire epidermis. All specimens were very fresh, most of them having parts of the animal and the operculum. Obviously they had been discarded by the fishermen as unworthy of notice. The largest of these measures 9 13/16 inches long. In addition to the *Busycon,* we picked up one fine specimen of *Dosinia discus.* To complete this wonderful "catch," a half-bushel basket was found conveniently near, with some discarded rope to make a handle!

(4). Cedar Island, on Metompkin Inlet, Accomac County. A group of five interested "shellers" hired a motorboat with owner for the trip to this outer island, which had only a Coast Guard Station and one house on it. The beach here looked more like the beaches of Florida's west coast—wave-rows of shells at the water line. Practically the only live material obtained were the two species of *Busycon. B. carica* was the more common, with many dead ones high up on the beach. A large lobster or

crab pot was filled with these for use as decoration around a garden. Of the live specimens collected, the largest measured 9 inches long. The dead shells on the shore contained some species not previously reported from so far north; namely, *Chione cancellata, Pecten gibbus,* and *Mulinia lateralis corbuloides.* The chiones were large; the largest measuring 39.7 mm. long (1 9/16 in.), and 35.8 mm. high.

(5). Birchtown, and Assateague Island, near Chincoteague. Assateague Island is a U. S. Wildlife Refuge, and we were interested to see what the molluscan fauna might be. A short trip via rowboat across Assateague channel from Birchtown, a small settlement out of Chincoteague, brought us there at low tide. We were much disappointed at the collecting on the channel side of the island, and because of the faintheartedness of the author, did not brave the mosquitoes and swampland to cross to the outer side. However, it probably would not have been markedly different from that found at Cedar Island. The one rewarding thing about this trip was a glimpse of the famous wild horses, of which we saw a half dozen or so when they came down to the shore. Bird life was abundant, and we wished we had had more time to study it. On our return to Birchtown, among the great piles of the famous Chincoteague *Ostrea virginica,* we found some very large *Eupleura caudata caudata* Say. The largest of these (Pl. 5, fig. 5) measures 41.6 mm. high (over 1 5/8 inches) by 21.5 mm. major diameter. We also found very large fresh specimens of *Busycon canaliculatum,* the largest measuring 7 15/16 inches long, 4 7/8 inches largest diameter. These were fresh, with operculum and animal. Here, too, we found the only chiton of our trip. *Noetia ponderosa* and *Arca c. pexata* were common amongst all the discarded oyster shells here as in other localities. The largest *A. pexata* found measures 64.3 mm. (over 2 1/2 inches) in length, 52.4 mm. altitude, 39.5 mm. diameter.

Urosalpinx cinereus Say, var. follyensis, new form. Plate 5, fig. 4.[1]

The differentiating characteristic of this form is its larger size due to an added whorl, making 8 plus whorls. The variety is named for the type locality, Folly Creek, Accomac, Virginia.

[1] Nomenclatorial subspecies.

The type measures: 51.2 mm. long, 24.1 mm. wide. Type ANSP. 186817; paratypes lot No. 992, author's collection.

EUPLEURA CAUDATA Say, var. ETTERAE, new form. Plate 5, fig. 5.[1]

This form is also characterized by an added whorl and its larger size. It was found both at Folly Creek and Birchtown, the type and the greatest number being taken at the latter spot. It is named for Mrs. Robert Etter of Onancock, Virginia. Type locality: Birchtown, Chincoteague, Virginia. The type measures: 41.6 mm. high by 21.5 mm. wide. Type ANSP 186818; paratypes include lot No. 991, author's collection.

LIST OF SHELLS FROM THE DELMARVA PENNINSULA

Numbers following specific names refer to the localities in the numbered paragraphs preceding, and indicate that the species was found at those places only. Species not numbered were found pretty generally in all the spots visited.

Chaetopleura apiculata 5
Nucula proxima 4
Arca campechiensis 4
A. campechiensis pexata
A. transversa 4
Noetia ponderosa
Ostrea virginica
Pecten irradians
P. gibbus 4
Anomia simplex
Mytilus edulis 3, 4
M. recurvus—Deep Creek
Modiolus demissus plicatulus
Astarte castanea 3
A. undata 4
Laevicardium mortoni 2
Dosinia discus 3
Chione cancellata 4
Venus mercenaria
V. mercenaria notata
V. mercenaria alba 4
Petricola pholadiformis 3, 4
Tellina tenera 2
Macoma balthica 2
Donax fossor 3, 4
Tagelus gibbus
Ensis directus 3, 4
Spissula solidissima 3, 4
Mulinia lateralis
M. lateralis corbuloides 4
Anatina canaliculata 4
Mya arenaria 2, 3
Barnea truncata 4
B. costata 4
Diadora alternata 4
Epitonium angulatum 4
E. multistriatum 4
Melanella conoidea[2] 4
Polinices duplicata
P. heros 3
P. triseriata 4
Sinum perspectivum 4
Crepidula fornicata
C. glauca convexa
C. plana
Littorina irrorata
Eupleura caudata
Urosalpinx cinereus
Anachis avara 2, 4
Mitrella lunata 4
Ilyanassa obsoleta
Nassarius trivitatus

[2] Reported by Mrs. Ernestine Taylor.

N. vibex
Busycon carica
B. canaliculatum
Mangilia plicosa 2
Melampus lineatus 1
Marginella apicina borealis 4
Terebra dislocata 4

A CLARIFICATION OF SOME CENTRAL AMERICAN UNIONIDAE DESCRIBED BY R. A. PHILIPPI

By RICHARD I. JOHNSON

R. A. Philippi described a number of new shells in the *Zeitschrift für Malakozoologie* during 1848 and 1849. Unfortunately most of the descriptions were mere sketches unaccompanied by figures. In this paper we have sought to clarify some of the Unionidae which have been carried in the literature for 100 years as *nomina dubia.* For two of the species we have type material. Some may take exception as to the status of this material because Philippi based each of his descriptions on one immature specimen selected from each lot by Largilliert which the latter sent to Philippi for description. As the specimens described are unavailable, we have thought it desirable to fix the names on this material which Largilliert kept and distributed, and which is as "authentic" as any we can ever hope to have. We have also united two of Philippi's names after the study of a more adequate series than was available to him.

I wish to thank J. P. E. Morrison and R. H. Rehder of the United States National Museum for suggestions and the loan of valuable type material; H. A. Vander Schalie for material from the Zoology Museum of the University of Michigan; G. Ranson of the Paris Museum for allowing me to look for Morlet's types; and W. J. Clench for his ever willing aid and council.

Leptodea largillierti (Philippi) Plate, 5, fig. 2.

Unio largillierti Philippi, 1847, Zeit. für Mal., **4**, p. 94 (Yucatan [Prov., Mexico]); von Martens, 1900, Biol. Central America, Moll., p. 94 [*nomen dubia*].

Lampsilis largillierti Philippi, Simpson 1914, Des. Cat. Naiades, Detroit, Michigan, **1**, p. 194 [*nomen dubia*].

Unio paludosus Morlet, 1849, Test. Noviss. Cubanae et America Centralis, **1**, p. 30 (swamps near San Geromino, Yucatan [now Campeche, Mexico]); Fischer & Crosse, 1894, Miss. Sci. Mexique, Part 7, **2**, p. 559, pl. 59, fig. 3.

Lampsilis paludosus Morlet, Simpson, 1914, Des. Cat. Naiades, Detroit, Michigan, **1**, p. 192.

Unio delphinulus Morlet, 1849, Test. Noviss. Cubanae et America Centralis, **1**, p. 192.

Unio delphinulus Morlet, 1849, Test. Noviss. Cubanae et America Centralis, **1**, p. 31 (swamps of the River Usumacinta and Lake Petén, [Guatemala]), Fischer & Crosse, 1894, Miss. Sci. Mexique, Part 7, **2**, p. 557, pl. 63, fig. 2, 2a, 2b.

Lampsilis delphinulus Morlet, Simpson 1914, Des. Cat. Naiades, Detroit, Michigan, **1**, p. 194.

Unio planivalvis Morlet, 1851, Test. Noviss. Cubanae et America Centralis, **2**, p. 24 (swamps in the vicinity of the River Usumacinta, [Guatemala]); Fischer & Crosse, 1894, Miss. Sci. Mexique, Part 7, **2**, p. 560, pl. 59, fig. 2.

Lampsilis planivalvis Morlet, Simpson 1914, Des. Cat. Naiades, Detroit, Michigan, **1**, pl. 193.

Description: Shell reaching 70 mm. (2¾ inches) in length symphonote, very thin to moderately thick. Outline elongated, subrhomboidal or subtriangulate. Valves compressed. Anterior end regularly rounded and subangulate above or sometimes slightly symphonote; posterior end produced and subtruncated. Ventral margin straight. Posterior slope compressed usually carried up into a high dorsal wing (often broken away). Excluding the wing, the dorsal and ventral margins are almost parallel. Posterior ridge low, double or triple, well developed and angular ending in a more or less distinct biangulation. Hinge ligament covered by wing. Beaks well forward of the center, beaks low but sharp, their sculpture fine and double looped. Surface of the shell smooth but covered with concentric growth lines, rather dull greenish yellow, or brownish olive. Left valve with one lamellar pseudocardinal and two slightly curved laterals. The right valve with two lamellar pseudocardinals, the upper one smaller and one slightly curved lateral. Beak cavities shallow with some muscle scars. Anterior adductor muscle scars shallow, posterior ones not visible. Pallial line usually visible at least anteriorly. Nacre irridescent bluish-white, or pinkish.

	Length	Height	Width	
Lectotype	70 mm.	38[1]	14	Yucatan, Mexico
Large	72	45	15	Puebla Nueva S. of Flores, Petén, Guatemala
Small	45	32	8	Puebla Nueva S. of Flores, Petén, Guatemala

[1] The wing is broken off the type.

Types: Largilliert sent Philippi a young specimen of this species from a lot of several specimens. Philippi promptly described this specimen, but did not give any measurements for it, nor did he state whether he returned the specimen to Largilliert. Philippi's collection is in the British Museum,[1] but to date no one has brought the specimen to light. Fortunately, Largilliert sent a specimen from his original lot to C. B. Adams with the note, "Espece nouvelle, et très rare, qui n'est dans aucune collection." It is here selected as lectotype, Museum of Comparative Zoölogy No. 155569. There is also a paratype MCZ No. 184531. (See note 3.) The type locality is Yucatan, Mexico, but as this constituted the whole penisular when the species was described, we hereby restrict the type locality to San Geromino, Campeche, Mexico.

According to the *Journal de Conchyliologie* (1893, **41**, p. 194) Morlet's types were acquired by the British Museum,[2] however, in the Paris Museum the author found three unnumbered cotypes of *L. delphinulus* glued on two plaques. *L. paludosa* and *planivalvis* were not represented, presumably these are in the British Museum, but I was unable to see that collection.

Range: Southern Mexico, Northern Guatemala and Honduras.[3]

Records: MEXICO: Swamps near San Geromino, State of Campeche, (Morlet); State of Tabasco (MCZ); Monte Christo, State of Chiapas (USNM). GUATEMALA, Province of Petén: Arroya at Puebla Nueva, South of Flores; San Pedro River above El Paso de los Caballos; Lake Eckixil; Lake Petén; Rio de la Pasion (all Univ. of Michigan); Swamps of Usumacinta River (Morlet). HONDURAS: (USNM)..

[1] Sherborn, C. D., Where is the . . . Collection? Cambridge, England, 1940, p. 194.

[2] Simpson (1900, Proc. U. S. Nat. Mus., **22**, p. 503) claims that Morlet's types of Naiades were in the United States National Museum, however, Dr. J. E. Morrison assures me, "We do not have nor have ever had any material from Morlet in this group of mussels."

[3] In the Museum of Comparative Zoölogy is a specimen received from Largilliert and labeled by J. G. Anthony as coming from Lake Nicaragua. On the other hand we have a specimen of *Anodon nicaraguae* philippi also from Largilliert and labeled Mexico while the type locality for this species is Lake Nicaragua. Obviously Anthony inadvertently switched the data when copying the labels.

Remarks: Goodrich and van der Schalie (1937, Univ. of Michigan, Mus. of Zool. Misc. Pub. No. 34, p. 46) united *Leptodea delphinulus* and *L. planivalvis* under *L. paludosus,* having had a series of some eleven lots on which to base this conclusion, I am in full agreement with them and have united all three species under Philippi's name which is the earliest. The species is subject to the same ecologic differences that characterize many species that live in both quiet lakes and swift streams. In the former case, the shells tend to be more thin and the wing is well developed. In the latter case, the shells are thicker and the wings are often broken or poorly developed. Young specimens have well developed wings in either environment.

We have followed Goodrich and van der Schalie in placing this species in *Leptodea.* Material for anatomical study was not available to check the validity of the sections. However, *Delphionaias* and *Phyllonaias* of Crosse and Fischer (1894, Miss. Sci. Mexique, Part 7, **2**, p. 555), are identical being based on two synonyms of *L. largillierti, U. delphinulus Morlet* and *U. paludosus Morlet.*

ANODONTITES NICARAGUAE (Philippi) Plate 5, fig. 1.

Andonta nicaraguae Philippi, 1848, Zeit, für Mal., **5**, p. 130 (Nicaragua) ; von Martens, 1900, Biol. Central America, Moll., p. 536; Simpson 1914, Des. Cat. Naiades, Detroit, Michigan, **3**, p. 1456.

Anodonta bridgesii Lea, 1868, Proc. Acad. Nat. Sci. Philadelphia, **12**, p. 95; 1869, Obs. Unio, **12**, p. 51, pl. 42, fig. 104 (Lake Nicaragua).

Anodontites bridgesii Lea, Simpson 1914, Des. Cat. Naiades, Detroit, Michigan, **3**, p. 1437.

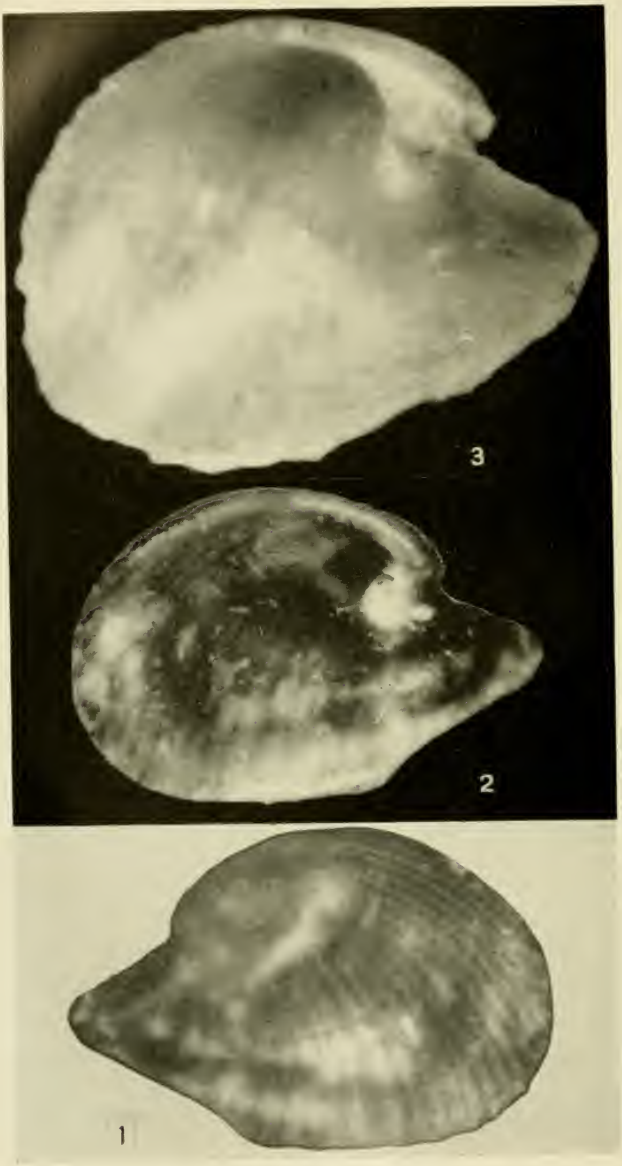
Anodonta jewettiana Lea, 1868, Proc. Acad. Nat. Sci. Philadelphia, **12**, p. 95.

Anodonta jewettii Lea, 1869, Obs. Unio, **12**, p. 49, pl. 41, fig. 101 (Lake Nicaragua) ; von Martens, 1900, Biol. Central America, Moll., p. 536.

Anodontites jewettianus Lea, Simpson 1914, Des. Cat. Naiades, Detroit, Michigan, **3**, p. 1437.

Description: Shell large reaching 132 mm. (5 inches) in length, moderately thin and translucent, inequilateral. Outline subeliptical or rhomboid. Valves subinflated or inflated. Anterior and regularly rounded, and subelongated above ; posterior end slightly

FIG. 1, *Anodontites nicaraguae*. 2, *Leptodea largillierti*. 3, *Succinea lauta sphaerica*. 4, *Urosalpinx cinereus follyensis*. 5, *Eupleura caudata etterae*.



Howard: The family Juliidae

more broadly rounded. Ventral margin slightly curved, may become incurved medically in older shells. Posterior ridge round and not very distinct. Posterior slope often with two slight corrugations especially in younger shells. Hinge ligament distinct. Beaks forward of the center and moderately full. (Sculpture erroded on all specimens observed.) Surface of the shell smooth greenish yellow, or ashy green, usually darker and more greenish toward the margins and on the posterior slope, sometimes shell with fine greenish rays. Hinge edentulous, beak cavities shallow. Anterior and posterior muscle scars generally not distinct. Pallial line not always visible. Nacre silvery or bluish irridescent, sometimes tinted with salmon.

	Length	Height	Width	
Paratype of *A. bridgesii* Lea	132 mm.	68	42	Lake Nicaragua
Holotype of *A. Jewettiana* Lea	108	62	45	Lake Nicaragua
Lectotype	64	38	22	Lake Nicaragua
Paratype	62	34	21	Lake Nicaragua

Types: Largilliert sent Philippi a very young specimen of this species which the latter described. The location of this specimen is unknown to us. Fortunately Largilliert sent a specimen from his original lot to C. B. Adams, here selected as lectotype, Museum of Comparative Zoölogy No. 184530. The type locality is Lake Nicaragua. There is also a paratype MCZ 17071 which was sent to J. G. Anthony. Lea's figured holotype of *A. bridgesii* is United States National Museum No. 86691. There is also a lot of paratypes. The figured holotype and only specimen of *A. jewettiana* is USNM No. 86681.

Range and Records: Known only from the type locality. River Tipitapa and sand bar north of River Estar, Lake Nicaragua [listed as *A. bridgesii*] (Tate, 1869, American Jour. Conch., **5**, p. 160).

Remarks: Unfortunately the figured lectotype is a young specimen and does not represent the species very well. Young specimens are almost eliptical but adults tend to become more rhomboidal and the ventral margin is usually incurved. *Anodontites nicaraguae* shows considerable variation and I do not

hesitate to place *bridgesii* and *jewettiana* in its synonomy. Lea's figure of *bridgesii* is a good illustration of the typical adult, though *jewettiana,* which is based on a single specimen, is quite rhomboidal and rather more inflated than most specimens. However, comparison with other material would place it in this synonomy.

Anodonta nicaraguae is known only from Lake Nicaragua, but further research may indicate that it is only a variety of *Anodontites glauca* Val. though we cannot determine that at present.

ANODONTITES CORNEA (Philippi)

Anodonta cornea Philippi, 1848, Zeit, für Mal., **5**, p. 130 (Nicaragua); von Martens, 1900, Biol. Central America, Moll., p. 535.

Anodonta atrovirens Philippi, 1848, Zeit. für Mal., **5**, p. 130; Simpson, 1914, Des. Cat. Naiades, **3**, p. 1456.

Anodonta inaequivalvis Lea, 1869, Proc. Acad. Nat. Sci. Philadelphia, **12**, p. 95; 1869, Obs. Unio, **12**, p. 52, pl. 43, fig. 108 (Lake Nicaragua); von Martens, 1900, Biol. Central America, Moll., p. 534.

Anodontites inaequivalvis Lea, Simpson, 1914, Des. Cat. Naiades, Detroit, Michigan, **3**, p. 1423.

Anodonta lenticularis Lea, 1868, Proc. Acad. Nat. Sci. Philadelphia, **12**, p. 95; 1869, Obs. Unio, **12**, p. 50, pl. 41, fig. 102 (Lake Nicaragua).

Anodonta inaequivalvis lenticularis Lea, von Martens, 1900, Biol. Central America, Moll., p. 534.

Anodonta granadensis Lea, 1868, Proc. Acad. Nat. Sci. Philadelphia, **12**, p. 96; 1869, Obs. Unio, **12**, p. 48, pl. 41, fig. 100 (Lake Nicaragua).

Anodonta inaequivalvis granadensis Lea, von Martens, 1900, Biol. Central America, Moll., p. 535.

Anodontites granadensis Lea, Simpson, 1914, Des. Cat. Naiades Detroit, Michigan, **3**, p. 1424.

Description: Shell small reaching 42 mm. (1½ inches) rather thin, slightly inequivalve. Outline subeliptical to subrhombidal. Valves subinflated. Anterior end regularly rounded; posterior end obliquely subtruncated above. Ventral margin rounded. Posterior ridge rather full and rounded. Hinge ligament small. Beaks well forward of the center, low and sharp. (Sculpture erroded on all specimens observed.) Periostracum concentrically striated, wrinkled and looped dark green or straw colored, oc-

casionally with darker posterior rays. Anterior adductor muscle scars distinct, posterior ones sometimes visible. Pallial line not distinct. Hinge edentulous. Nacre bluish or silverly irrisencent.

	Length	Width	Height	
Holotype of *A. inaequivalvis* Lea	42 mm.	38	16	Lake Nicaragua
Holotype of *A. lenticularis* Lea	35	26	14	Lake Nicaragua
Holotype of *A. granadensis* Lea	35	22	12	Lake Nicaragua

Types: The types of Philippi's species may be in the British Museum. Lea's figured holotype of *A. inaequivalvis* is United States National Museum No. 86767, of *A. lenticularis* USNM No. 86704, and of *A. granadensis* USNM No. 86655. The type locality of both Philippi's and Lea's species is Lake Nicaragua.

Range and Records: Known only from the type locality. Lake Nicaragua, near San Ubaldo, and River Malacatoya [listed as *A. inaequalis* [sic] Lea] (Tate, 1869, American Jour. Conch., **5**, 160).

Remarks: This species shows great variation. It is generally subeliptical but occasionally subrhomboidal. Specimens may be dark green or straw-colored. This latter character led Philippi to apply two names to this species. In speaking of the three names that he applied to *A. cornea,* Lea said (1869, Obs. Unio, **12**, p. 49) "The three are very closely allied. . . ." Simpson (1914 Cat. Naiades, **3**, p. 1424) has united *inaequivalvis* and *lenticularis* and admits that *granadensis* is probably only a variety. We do not hesitate to include them all under Philippi's earliest name.

In his synonomy Simpson also included *A. glabrus* Sowerby, A. *montezianus* Sowerby and *A. viridana* Clessin, but these are from Mexico, and are ill defined. I doubt that they belong under *A. cornea.* We chose the name *cornea* instead of *atrovirens* as it has paged precidence.

THE FAMILY JULIIDAE[1]

By ARTHUR DAY HOWARD

While sorting the bottom samples taken by the *Velero III* from Socorro Isle, 1934, we found a shell that was new to us. The form was so peculiar that we made a few notes and sketches hoping sometime to find more material. Some time later a very small specimen was found in some dredgings from the southwest Pacific. Having found two specimens we set out to place the shell in its systematic position, if possible.

As first identified it was found to belong to the Prasinidae which was named by Deshayes (1863) from a shell discovered on the Isle of Bourbon (Réunion), Indian Ocean, *Prasina borbonica.* The previously discovered *Julia exquisita* Gould, 1862, Sandwich Islands, was later given precedence as the name of the genus. Dall, 1898, figured *J. floridana* Burns, Eocene, Florida, which he said is the only American fossil of the genus from any horizon. This is, so far as we know, the first report of the Juliidae from this continent. Fischer, 1887, in his *Manuel de Conchyliologie,* made *Julia* a sub-genus of *Prasina* in the family Prasinidae. Dall, 1895, accepted this classification with a question. He later, 1898, after the examination of more material, concluded that *Prasina* and *Julia* were identical and therefore the older name, *Julia,* according to the rules of nomenclature, would be given to the genus. He also found grounds for establishing the family Juliidae.

Woodring, 1925, described a new fossil species *J. gardnerae* from Miocene of Jamaica employing the family title Juliidae. He mentions the *J. floridana* of Dall and three European fossil species. A new living west American species was described by Pilsbry and Olsson in 1944, found at Panama, in Colombia, Ecuador and Peru. It was named because of its distribution *J. equatorialis.* Also in 1944 Dr. C. Beets gave a detailed account of the genus and listed nine species.

We then have in all the following species described up to the present time:

[1] Contribution no. 52 from the Allan Hancock Foundation, University of Southern California, Los Angeles, California.

Living: *J. exquisita* Gld., Hawaii
J. borbonica (Dh.) Bourbon, etc. Indian Ocean
J. cornuta (de Folin), Mauritius, Indian Ocean
J. equatorialis P. and O., Panama to Peru
Fossil: *J. douvillei* (Cossmann and Peyrot), France
J. floridiana Dall, Florida
J. gardnerae Woodring, Jamaica
J. girondica (C. and P.), France
J. lecointreae (Dollfus and Dautzenberg), France
J. . . . . . undescribed, from Santo Domingo.

The first two specimens we found were weathered, dead shells, with no color except white. However, we discovered a shell, a left valve, from Cape San Lucas that had recently been alive which possessed the distinctive characters of *Julia exquisita* of Gould and *Prasina borbonica* of Deshayes. The ground color is green, and strong lines of deeper green radiate from the umbones to the ventral edge, about 22 in number. The shell is transparent and markedly polished, especially in the interior. A muscle scar is slightly visible in the middle of the posterior part of the valve. A strong column arises from the interior, anterior to the byssal fissure and the prominent beak, and meets a similar column in the right valve. The column is slightly enlarged at its inner end and probably fits into a depression in the other valve. These colums give a marked rigidity to the hinge structure. Subsequently we found four valves, 2 right and 2 left, in the dredgings from Socorro Island; one of these is larger (3 mm. long) than the others. Its dimensions, long 3, alt. 2.8, diam. 1.5 mm. The size maximum, 3 mm., is smaller than the specimen of Gould which measured long 5, lat. 4, alt. 4 mm. A valve from Santa Cruz is larger, as noted below.

The method of collecting the fresh shell suggests where this comparatively rare species may be found. It was obtained from washings of marine algae in shore collecting by Dr. Yale Dawson near Cape San Lucas. I would surmise that the live mollusk would be obtained attached by a byssus to green algae. To summarize the distribution as we found it we have one specimen from Braithwaite Bay, Socorro Island, 16 fathoms; 4 Braithwaite Bay, 14–18 fathoms; 1 fresh left valve in shore collecting 5 miles east of Cape San Lucas; 1 right valve measuring, length 4,

height 3, diameter 0.75 mm., from Chinese Bay, Santa Cruz Island, in 17 fathoms.

Through the courtesy of Dr. James G. Needham and Dr. John W. Wells of Cornell University we have been able to compare our shells with those described by A. A. Gould in 1862. The form is, in major details, the same, but in size they differ markedly. The largest of those from Socorro Isle measures only 3 mm. in length while Gould's specimens in 5 mm. long and of much heavier build. As shown in the illustration, the possession of lines is quite striking in the Pacific Coast shells. However, the lines may be a character of only fresh or juvenile shells. The shells of *J. exquisita* have a porcelanous texture while these shells are translucent to almost transparent. In form and size and apparently marking our shells come nearest to *J. equatorialis.* The pattern of ornamentation of *J. equatorialis* was described as "about 20 very shallow radial lines," but on renewed examination, Dr. Pilsbry thinks that the lines are the remains of color lines, any appearance of slight impression being owing to differential erosion of the beach-worn shells. In size and form a Socorro specimen compared is indentical with some of the equatorial shells. At any rate, we have now a correct description of the ornamentation, and an extension of the distribution some two thousand miles to the northwest of Panama, the northernmost reported locality for *J. equatorialis,* and three thousand miles east of Hawaii, the home of *J. exquisita.*

The figures are from photographs by Daniel H. Chapman and Akira Asakura. Plate 6, fig. 1, the exterior of the left valve from Cape San Lucas, AHF No. 4461, length 2.75, alt. 2, diam. .5 mm., broken anterior edge. Fig. 2, the interior of the same (extremely difficult to photograph because of the polished surface). Fig. 3, the interior of the largest of the Socorro Isle shells, AHF No. 4341.

Literature cited

Beets, C. 1944. Geologie en Mijnbouw, N. S. 6 Jaargang, No. 3–4, pp. 28–31.

Dall, W. H. 1898. Trans. Wagner Free Inst. Sci., Vol. III, pt. 4, p. 810.

Dall, W. H., Bartsch P., and Rehder, H. A. 1938. A manual of the recent and fossil marine pelecypod mollusks of the Hawaiian Islands. Bull. 153, Bernice P. Bishop Mus.

Deshayes, G. P. 1863. Cat. Moll. Isle de Réunion, p. 25, 1863, in Maillard. Notes sur L'Ile de La Réunion.
Fischer, Dr. Paul. 1887. Manuel de Conchyliologie, p. 949, 950, Paris, 1887.
Folin, L. de, et Perrier, L. 1867–71. Les Fonds de la Mer, p. 83, pl. 9, fig. 7, I Paris, Savy.
Gould, A. A. 1862. Proc. Bost. Soc. Nat. Hist., VIII, p. 284, 1862.
Pilsbry, H. A., and Olsson, A. A. 1944. A West American Julia, Nautilus, **57**, p. 86, 87.
Woodring, Wendell P. 1925. Miocene mollusks from Bowden, Jamaica. Pelecypods and scaphopods. Pp. 87, 88. Carnegie Inst., Washington.

LAND SNAILS FROM THE GUADALUPE RANGE, TEXAS

By H. A. PILSBRY and E. P. CHEATUM

The southeastern end of the Guadalupe Mountains in New Mexico and Texas proves to be rather rich in local land snails, and doubtless is well worth further exploration. A beginning was made in 1922, when J. H. Ferriss and the senior author collected for a few days, finding new holospiras, the fine *Humboldtiana ultima* and other shells. In November, when we were there, the moutain tops were already white with snow; it was bitterly cold, and we had to make fires from time to time to restore feeling to our benumbed fingers. These conditions cut our stay short. A second brief exploration was made last year by the junior author, whose account of the trip follows.

During July, 1950, my wife, two sons, and I spent two days collecting shells in the Guadalupe range of mountains at Pine Springs, Texas. Occupying the same tourist court with our party were students and teachers from Kansas University and Columbia University, both groups studying the fossil invertebrates of that area.

Since I was in the process of coming down with virus pneumonia, I didn't feel much like climbing the mountains for shells, but fortunately for me, Mrs. Winnifred Fischer, wife of Dr. Wm.

Fischer of the Geology Department at Kansas University, and her son Bill offered to serve as guide and help collect shells. The trip up the mountains which yielded the new *Ashmunella* was made by my wife and eldest son, Don.

Typical vegetation of that section in dry areas consisted of ocotilla, cacti, and lechueguilla. Mr. Yochelson from Columbia University made the trip with me to McKittrick Canyon, where we found new Holospira. Mrs. Wm. Fischer discovered *Holospira roemeri* in Bone Spring Canyon. This canyon heads back into the mountain mass between El Capitan and Guadalupe Peak, just to the west of Guadalupe Canyon. Flanking both McKittrick and Bone Spring Canyons are limestone cliffs with sufficient vegetation, crypts, etc., to adequately support and protect the mollusk population.

ASHMUNELLA EDITHAE **new species.** Plate 4, fig. 10.

The shell is depressed with very slightly elevated spire and a sharply carinate periphery. The umbilicus is contained about three times in the diameter, noticeably widening in the last whorl. The surface is hyaline, pale brown, with fine unevenly spaced growth lines present on all except the smoothish initial whorls. The whorls are weakly convex above, the last whorl carinate with a convex base, slightly descending in front. The aperture is strongly oblique; peristome white, rather narrowly expanded above and reflected at the outer and basal margins. The parietal wall with a deeply placed short oblique, straight tooth. Within the outer lip is a conic tooth; in the basal margin two slightly compressed teeth.

Height 5.5 mm., diameter 16.2 mm.; 5¼ whorls. Type.
Height 5.5 mm., diameter 15 mm.; 5¼ whorls. Paratype.

Guadalupe Range, near the top of the mountain up Pipe Line Canyon, Pine Springs, Texas. Type ANSP; paratype in Cheatum collection.

A. edithae is related to *A. kochi* but is smaller, the spire more elevated and the periphery sharply carinate. The parietal tooth does not bend toward the columella; the tooth within the outer lip is not obliquely set and tapers to its tip rather than being blunt topped. This species is named for the wife of the junior author, who found the shells.

HOLOSPIRA PITYIS **new species.** Plate 4, figs. 3, 3a.

The shell is short, cylindric in the last three whorls which form over half the total length; the first five whorls taper rapidly. Embryonic 1½ whorls smooth, second whorl very convex, the protoconch somewhat nipple-like. Remaining whorls very finely and closely rib-striate, the riblets pale against gray ground. The antepenult whorl with about 80 distinct riblets. The whorls are convex, the last straightened and slightly protruding forward. The aperture is ovate the outer posterior portion angulated. The straight parietal margin of the peristome is in contact with, or is barely free from the last whorl, but elsewhere the peristome is continuous, free and expanded. Inside the shell there is a small columellar lamella within the latter part of the penultimate whorl, near its base. Length 8.5, diameter 4 mm.; 9 whorls.

Guadalupe Range: Pine Springs Camp, Texas.

Holospira montivaga form *breviaria* Pils. is a more narrowly cylindric shell with stronger sculpture. It is usually larger than *H. pityis,* which in a considerable number collected appears to vary but little in size and shape. Named from its pine cone shape.

HOLOSPIRA ORITIS **new species.** Plate 4, figs. 5, 5a.

The shell is cylindric in the lower four or five whorls, those above tapering slowly. The embryonic whorls are smooth, the following whorls finely and closely rib-striate, the riblets paler than the blueish- or brownish-gray intervals. Riblets on the penult and some earlier whorls are subdued and irregular or wanting, they reappear on the last whorl, and are coarser on the last half whorl. The eighth whorl has 52 distinct riblets. The whorls are somewhat convex, the last straightened and shortly projecting forward. The aperture is rounded below, truncate above; peristome is continuous, free, and narrowly reflected.

Internal structure is variable. The type and several other specimens opened have a blunt lamella near the base of the axis in the end of the penult and beginning of the last whorl. In another specimen there is also a lamella on the basal partition of the penult whorl. In still another shell within the penultimate whorl there is a strong lamella, at least one-half whorl long, on the upper wall and a strong blunt oblique lamella near base of the columellar axis; also a weak lamina on the floor of the cavity.

Length 20.8 mm., diameter 5.4 mm.; 15½ whorls.
Length 19.4 mm., diameter 5.5 mm.; 15 whorls.
Length 16.8 mm., diameter 5.0 mm.; 13½ whorls.
Length 14.9 mm., diameter 4.8.; 14 whorls.

This species was collected near Pratt's Lodge in McKittrick Canyon in the Guadalupe Range approximately 7 miles from Pine Springs, Texas. They were upon rocks of a jutting escarpment of limestone near a stream.

The number of smoothish whorls is variable. In some specimens scarcely more than the penult whorl is smooth, but in some others five or six whorls may show no distinct striation. By the variable number of internal lamellae in the penult whorl it resembles the Big Hatchet Mountain species.

This snail is evidently related to *H. montivaga* Pilsbry but it is much less strongly costulate than that species. (Name from ὀρεῖτις, a mountaineer.)

THE PRESERVATION OF SLUGS

By LESLIE HUBRICHT

The old method of killing slugs by drowning in a container filled with water is unsatisfactory because the slugs struggle and secrete large quatities of slime. The resultant specimens are not fully expanded and slime obscures the color pattern.

In the genus *Philomycus* there are a number of apparently distinct color patterns which seem to have definite geographical ranges. But when specimens are preserved these patterns are obscured by contraction and slime so that their distinctness is lost. I realized that if the genus *Philomycus* was to be understood, a better method of preservation would have to be found. After trying a number of methods I found that the following procedure would produce satisfactory results.

Fill a tight container with water and add enough Chloretone to insure a saturated solution and let stand for several days to disolve. When killing slugs some of this solution is poured off into a jar and enough water added to cut the strength to 10 to 20 percent. It is not necessary to fill the jar as the slugs will not struggle or climb out, but in a few minutes become

relaxed and extend themselves. Killing requires from three to ten hours depending on temperature. When they are dead, which can be tested by pinching the tentacles with a pair of forceps, if there is no reaction they are ready for fixing. For fixing add enough 40 percent formaldehyde to make a solution of one part of the formaldehyde to 16 parts of water and leave for from 24 to 48 hours. After fixing they should be removed to 70 percent alcohol for preservation.

When this method is used the slugs are preserved life size with the color patterns clear, and there is no fermentation of the stomach contents which sometimes happens with the old method. Although the killing is hastened by warmth, care should be taken to prevent overheating. The heat produced by parking a car in the sun will ruin the specimens if they are left inside.

SOME NOTES ON HALIOTIS

By JOSHUA L. BAILY, JR.

For some years past, I have been assembling data concerning the abalones of this coast with the idea of someday publishing a detailed monograph of this interesting group. But a recent contribution to the Natural History Museum of San Diego by Mr. Reg Richardson, an amateur diver of La Jolla, contains such interesting material that it appears justifiable to place it on record without further delay.

Among this was a single specimen of *Haliotis sorensoni* Bartsch. This is the species formerly called *H. assimilis* Dall in local collections, but it is not that species. *H. sorensoni* may readily be distinguished by its nearly circular outline and its relatively thin shell. Locally it is known as the "true pink abalone" to distinguish it from the "false pink abalone" which is *H. corrugata* Gray. So far as I am aware, *H. sorensoni* has never been recorded from La Jolla before, although it has undoubtedly been taken there, as it has been reported from Point Concepcion to the north and from Guadalupe to the south.

A more interesting find, however, consists of a pair of specimens of what I believe to be the lost species of C. B. Adams, *H.*

ponderosa. They fit perfectly the description and figure given by Bartsch.[1] They resemble large coarse specimens of *H. rufescens* Swainson and perhaps might more appropriately be considered a variety of that species, though well worthy of a distinguishing name. However, until the opportunity of comparing them with the type has been realized it is better to withhold final judgment. An authentic specimen of *H. rufescens* was taken with them, and Mr. Richardson pointed out that the meat in *H. rufescens* is light while in the supposed *H. ponderosa* it is dark. This difference may prove to have greater taxonomic significance than any of the purely conchological features.

Although there were no black abalones in Mr. Richardson's donation, perhaps a few observations on the nomenclatorial vicissitudes through which this species has passed may not be considered out of place at this time. Formerly two species of blacks were recognized, *H. cracherodii* Leach, in which the perforations are variable in size and irregularly placed, both with respect to their common locus as well as to each other, and *H. californiensis* Swainson in which the perforations are placed with geometrical precision. The latter has a significantly greater number of perforations, but the ranges of variation of the two overlap. Recently Bartsch [2] has united the two in a single species on the ground that specimens from San Bonita (*sic*, error for San Benito) Islands form perfect intergrades connecting the two. Personally I concur in this conclusion, but for a different reason.

Occasionally specimens of black abalone are found which are completely imperforate. Since the two recognized species differ only in the nature of the perforations it follows that imperforate specimens might be referred with equal propriety to either species. If two species are admitted two corresponding varieties would have to be recognized, each of which would be entitled to a name, although the two would be absolutely indistinguishable. Since there are no criteria of taxonomic value other than the perforations, this anomaly can be avoided only by uniting the two species or by giving separate specific rank to the imperforate form.

[1] Proc. U. S. N. M., v. 89, p. 52, pl. 7, 1940.
[2] Loc. cit., p. 55.

The first record of the imperforate form seems to have been made by Kelsey [3] who referred to it as a freak and gave it no name, though he subsequently told me that he considered it a legitimate variety. Mr. Kelsey obtained his single specimen from Mr. Frank X. Holzner, the game warden of San Diego County, who kept a curio store on the site of the present Crystal Palace Building in San Diego, who in turn found it in a shipment of shells from Ensenada. I was in Mr. Holzner's store when he found the shell and gave it to Mr. Kelsey, and can certify to the accuracy of the latter's statement that it was devoid of holes and had no indication of any intention in that direction.

Later Hemphill [4] described an imperforate variety which he called *H. cracherodii holzneri.* Although he declared that Kelsey's specimen belonged to this variety inspection of Hemphill's three cotypes now in the collection of the San Diego Society of Natural History reveals conclusively that this was not the case. Hemphill's specimens are all pathological monstrosities. The black abalone, unlike the other species, sometimes lives on cobble stones, and, in conforming to the surface of the cobbles the shell becomes distorted, so that the aperture is curved in three dimensions. If the cobbles are rolled about as the result of wave action during a storm, the abalones adhering to them will be exposed to the risk of fracture, and since the locus of the perforations is structurally the weakest part of the shell it is here that the fracture is most likely to occur. If then the mollusk succeeds in salvaging the fragments of its covering by cementing them together with a fresh deposit of calcareous matter the perforations may become obliterated. This is quite obviously what happened with Hemphill's types. There is a well pronounced scar where the holes used to be, and consequently his name lacks taxonomic significance.

Later, Dall [5] described the normally imperforate form as *H. cracherodii imperforata* and still later he figured it.[6] (Incidentally his figure is not the original specimen found by Mr.

[3] Nautilus, v. 18, p. 67, 1904.
[4] Trans. San Diego Soc. Nat. Hist., v. 1, no. 2, p. 4, 1907.
[5] Proc. U. S. N. M., v. 56, p. 370, 1919.
[6] Bull. U. S. N. M., 112, p. 184, pl.

Holzner and given to Mr. Kelsey, but the description fits it closely. I do not know what became of Mr. Kelsey's shell.) In the latter publication, Dall recognized Hemphill's name and so evidenced his belief that there were two imperforate forms, one normal and the other pathological, and the fact that the specimen which he figured as *H. c. holzneri* is obviously not that form does not vitiate this interpretation. Dall's name cannot be used as there was a prior *Haliotis imperforata* of Gmelin, 1791 (Syst. Nat., ed. 13, I, p. 3690), now known to be a synonym of *Stomatia phymotis* Helbling.[7] On account of this preoccupation of the name imperforata Finlay [8] renamed this form *H. c. lusus* and this seems to be the correct name by which it will be known. The thought sometimes expressed that the normally imperforate variation is unworthy of a separate name is, I think, not well taken, for surely the complete absence of perforations should be accorded as much taxonomic significance as variations in their number, size, or position.

There are several other well recognizable varieties of black abalone, but the discussion of their validity must be deferred until more material is at hand.

A NEW VARIETY OF SUCCINEA FROM JAPAN

By GORDON K. MACMILLAN
Carnegie Museum

Succinea lauta sphaerica var. nov. Pl. 5, fig. 3.

Shell ovate, quite globose, dark amber colored, thin, fragile, pellucid; periostracum shining, minutely wrinkled obliquely, rougher towards aperture, with a malleated appearance; spiral striae weak, more prominent towards the suture; suture moderately impressed; spire very small, not prominent, not pointed; whorls 3½, rounded, last very large, expanded, and inflated; aperture oval, very large, expanded, slightly oblique at the outer margin, parietal wall and columellar margin with a slight callus deposit; peristome acute, simple, thin; columella thin, sharp, narrowed. Height 24.1 mm.; breadth 14.6 mm.

[7] I am indebted to the late Mr. E. G. Vanatta for this information.
[8] Trans. New Zealand Inst., v. 57, p. 492, 1927.

Type Locality: Tobi Shima, Ugo, Japan. *Holotype:* Carnegie Museum No. 62.39794, Section of Invertebrates. *Paratypes:* Academy of Natural Sciences of Philadelphia No. 84867 and Carnegie Museum No. 62.15753 and No. 62.39795, Section of Invertebrates.

The measurements of the paratypes in the collection of the Carnegie Museum and the Academy of Natural Sciences are as follows: Height: 19.8–24 mm. Breadth: 11.8–14.5 mm.

S. l. sphaerica is a much more globose shell than *S. lauta;* the spire is blunter, the whorls of which do not form a pointed apex; the surface of the shell is more coarsely sculptured and more malleated towards the aperture; the whorls are rounder; and the aperture is much more rounded and expanded.

This new variety is apparently *Succinea lauta* var. that Dr. W. Kobelt mentions and figures in "Fauna Molluscorum Extramarinorum Japoniae," 1879, p. 102, pl. 7, fig. 21b. It is *Succinea lauta* Gould from Tobishima, Ugo, in Y. Hirase, "The Conchological Magazine," vol. 3, No. 3, March 1909, p. 21, and *Succinea lauta* Gould (var.), specimen number 1044, from Tobishima, Ugo, on page 22 of "The First Additional Catalogue of the Land Shells of Japan to be had of Y. Hirase," 1908.

Daniel B. Langford in his article "Hunting Eulota (Karaftohelix) fiscina Fulton, in Saghalien" (Naut., **41**, 1927, 40) mentions *Succinea lauta karaftoensis* Pilsbry, which had been collected on decaying logs and stumps and under bark at Ichinosawa, Kiminai, and Kawakami on Saghalien Island. Dr. Pilsbry informs me that it is of more slender shape than *S. lauta* or *S. lauta sphaerica.*

Tobi Shima is a small island situated about nine miles west of Kisakato in the Province of Ugo on the Island of Honshu.

At present *Succinea lauta* has been collected at the following localities in Japan:

Tokyo, Saitama, Honshu Island
Nikko, Totshigi, Honshu Island
Sotakaifumura, Sado Island
Hakodate, Hakodate, Hokkaido Island
Kigokawa, Ojima, Hokkaido Island
Nishigo, Uzen, Honshu Island
Sapporo, Sapporo, Hokkaido Island

Of these records, the shells from Sado Island and Uzen Province are the closest to Tobi Shima and which are south and southwest of this locality. Since specimens of *S. lauta* have also been collected from Hakodate, Hokkaido Island, which is north of Tobi Shima, there is the possibility that *lauta* exists in the intervening territory, and it is on this assumption that *sphaerica* has been made a variety of that species.

ADDITIONAL NOTES ON THE FOREIGN SNAILS OF LOUISIANA

By HAROLD W. HARRY

After I had submitted previous notes on this subject (Nautilus, **62**: 1, pp. 20–24, July 1948), several additional data came to light. Chance alone accounts for the finding of Taylor's (1899) report of *Limax flavus* in North Louisiana. The obscurity of the "Gulf Fauna and Flora Bulletin," only three numbers of volume one having appeared, may allow a brief summary of his article.

Having observed this slug over a period of several years, Taylor pronounced it the most abundant mollusk at Ruston. Oviposition was reported from February to December, with possibly more than one generation per year. During an unusually severe freeze of 1898–99 he thawed these slugs from ice and found them viable, and slugs under boards buried in the snow were crawling about. Dryness was found to be a more important limiting factor than cold. At the turn of the century, *L. flavus* was considered a pest, as contaminants of the open wells which were then the chief source of drinking water in the area. If not quickly removed, those which fell into the water rotted and produced obnoxious odors; this often necessitated bailing out the well, and in some cases its abandonment. Taylor suggested that the presence of slugs in the water might lead to disease. As remedial measures he proposed removing all moisture-retaining rubbish from about the well, using tar, sand, salt, ashes or sawdust as barrier-irritants, and keeping a few ducks about to eat the slugs; chickens found them distasteful.

In the same publication Frierson (1899) lists 53 mollusks from Desoto Parish, and comments, "Professor Taylor also sent several examples of *Limax flavus* from Ruston, La. . . . I have not seen any as yet in DeSoto Parish, though it follows the railroad like the English Sparrow." On Christmas Day of 1949 I found several immature examples of *L. flavus* in a vacant lot of the little village of Frierson, DeSoto Parish, which was founded by the family of the Louisiana conchologist (see Strecker, 1929.) Eggs of this slug containing well developed embryos were found at Shreveport in February 1945 and December 1949.

In June, 1948, Dr. Richard Stone gave me examples of *Limax marginatus* Müller which he had collected in an overgrown vacant lot near King's Highway and Line Avenue in Shreveport. Later that year he found it in other localities in the general vicinity. Specimens have been submitted to Dr. W. O. Gregg for verification, and are deposited in his collection. Though I searched in the same vacant lot where this species was first taken by Dr. Stone, I was unable to find any specimens in December, 1949, and conclude that it is probably rare.

Bradybaena similaris is apparently much more widely distributed in New Orleans than I had previously known. Later I found it in Audubon Park, and in several gardens widely separated in that city.

Whether *Polygyra texasiana* (Moricand) is an imported snail in some parts of Louisiana, as I suggested in the earlier note, is questionable. I have lately examined material labeled *P. texasiana* and *P. triodontoides* in the Museum of Zoology, University of Michigan, also several lots which Mr. E. L. Krinitzsky has recently taken in Louisiana, and some unsorted material of my own collecting. These lots include the following localities: DeSoto Parish (five lots, probably all obtained and distributed by Frierson); drift material from the Red River at Montgomery, Grant Parish (A. A. Olson); Alexandria, Rapides Parish (W. J. Clench); near Bayou Pierre in Shreveport and at Forbing, Caddo Parish (H. W. Harry); New Orleans, a vacant lot below Jackson Square (H. W. Harry, 1941); also the specimens taken by Mike Wright, in "Orleans Parish," and cited by Goodrich (Nautilus, **53**, p. 105); South of the Old Capitol in Baton Rouge (H. W. Harry, 1941, 1947); Near the lake in Lake Charles, Calcasieu

Parish (H. W. Harry, 1941); flood plain of the Cane River at Natchitoches, Natchitoches Parish (E. L. Krinitzsky, 1948); along the Mississippi River at Hard Scrabble Bend, Tensas Parish (E. L. Krinitzsky, 1948).

All these lots show the labial teeth to be variable in separation, but usually rather widely spaced, so that in no instance is the interdenticular sinus deeper than wide. Yet some of the specmens from Tensas Parish, though obviously bleached, retain sufficient color to show a peripheral maroon band. The recognition of two species of this variable complex in Louisiana seems without justification, at least until more distinctive characters are ellucidated than the relative ones of the shell.

Having read Pilsbry's account (1948) of *Deroceras reticulatum* I rechecked available specimens of *Deroceras* from the lower Mississippi valley to see if any might be referred to that species. Preserved slugs from the following localities were examined: Louisiana State University Campus, Baton Rouge (E. B. Prince, 12 March 1950); 10 Miles south of Shreveport, Caddo Parish (Dec. 1949); Frierson, DeSoto Parish (Christmas, 1949; very common with the *L. flavus* cited above); 13 Miles North of Holly Springs, Marshall Co., Miss. (2 April 1949); Rankin Co., 4 Miles east of Jackson, Miss. (4 April 1949); Crystal Springs, Copiah Co., Miss. (4 April 1949); 4.6 Miles east of Greenwood, Carroll Co., Miss. (3 April 1949). Except for the Baton Rouge specimens, all lots were collected by me. They were taken under detritus in vacant lots and along roadsides, ideal situations for the presence of *D. reticulatum* or other tourist snails.

Many examples of large size (25 mm. long, preserved) were noted in the field. The color is usually almost black on the mantle and postdorsal areas, though motled gray on the lateral and anterior portions. A few specimens vary to light gray or tan. The tail is sharply keeled for a short distance at the tip, and always prominently truncate in preserved material. The pneumostomal area is the color of the mantle, or sometimes shows a stellate area of lighter shade, but never is this region as light or as extensive as I have seen it in some *D. reticulatum* from

Michigan. When dropped into alcohol, the slugs produced moderate amounts of an opaque, white, strongly adhesive slime.

Examination of the internal anatomy discredits their being *D. reticulatum,* and I can only conclude they are all *Deroceras laeve* (Müller), as Pilsbry (1948) describes this species. All lack a rectal caecum, and have the ovotestis deeply imbedded in the anterior part of the posterior liver lobe, not evident on the periphery of the visceral mass. Though only one to three specimens from each station were examined, all are aphallate. A specimen from Crystal Springs, Miss., and another from 10 Mi. south of Shreveport show a small, subspherical appendage on the lower reproductive duct, near the atrium, which may be an *Anlage* of the penis. Some of the Mississippi specimens were found ovipositing; three specimens from near Batesville (Panola Co., Miss., 3 April 1949) were clustered together with extended genitalia, but unfortunately these slugs were lost. In 1941 I examined phallate specimens of *D. laeve* from East Baton Rouge Parish which agree with the external characters outlined above; however, data on the season of collecting the specimens is lacking.

Preliminary examination of the radulae of specimens from all cited stations revealed no salient differences among themselves nor from *D. reticulatum* from Missaukee Co., Michigan, which was dissected for comparison. All agree with Vanatta's drawing of the radula of *D. laeve* from Isle Royal, Mich. (Pilsbry 1948, p. 540, fig. 289D).

Representatives of *Limax, Deroceras* and *Polygyra* mentioned herein are on deposit at the Museum of Zoology, University of Michigan.

References

Frierson, L. S. 1899. A contribution to a knowledge of the mollusca of Louisiana, as found in the Parish of DeSoto. Gulf Fauna and Flora Bulletin, 1(3):74–80. Ruston, La., F. T. Grayson, printer.

Pilsbry, H. A. 1948. Land mollusca of North America, 2: 2.

Strecker, J. K. 1929. Lorraine Screven Frierson, a Southern Conchologist. Contrib. from Baylor Univ. Museum, 21: 1–12, 1 portrait.

Taylor, W. Edgar. 1899. The common slug, *Limax flavus,* as a nuisance. Gulf Fauna and Flora Bulletin, 1(3): 69–73.

THE MOLLUSKS OF DAUPHIN COUNTY, PENNSYLVANIA

By ROBERT A. HEILMAN

Dauphin County is a land area of 521 square miles situated in southeastern Pennsylvania. The southern end of the county lies within the Piedmont Province while the remaining and larger portion of the county lies within the Appalachian Valley Province. This county is drained by many small creeks which empty into the Susquehanna River, the western boundary of Dauphin County. Its forests are chiefly deciduous, although there are some large stands of evergreens.

The field work which forms the basis of this report was done mostly in the area lying between the Second Mountain and the Conewago Creek. This region might well be termed the Swatara Valley since the Swatara Creek provides the major drainage source for this region. The soil of this valley is rich in limestone and calcareous shales and has been extensively developed by man agriculturally and industrially with the result that many of the natural habitats favorable to a molluscan population have been destroyed or depleted.

Throughout this section of Dauphin County, a total of 49 different forms of mollusks was collected, representing 17 families and 29 genera. The list of species follows:

Triodopsis tridentata (Say)
T. tridentata juxtidens (Pilsbry)
Mesodon albolabris (Say)
**M. thyroidus* (Say)
Haplotrema concavum (Say)
Ventridens ligerus (Say)
**V. suppressus* (Say)
Retinella binneyana (Morse)
R. burringtoni (Pilsbry)
R. wheatleyi (Bland)
R. indentata (Say)
Hawaiia minuscula (A. Binney)
Zonitoides arboreus (Say)
**Anguispira alternata* (Say)
A. alternata angulata P. & V.
Discus cronkhitei (Newcomb)
D. cronkhitei catskillensis (Pilsbry)
Helicodiscus parallelus (Say)
Succinea ovalis (Say)
Pupoides albilabris (Ward)
Vallonia pulchella (Müller)
Deroceras laeve (Müller)
D. reticulatum (Müller)
Philomycus carolinianus flexuolaris (Raf.)
Pseudosuccinea columella (Say)

* The species indicated by an asterisk were previously reported from Dauphin County by Charles B. Wurtz in "New State and County Records of Land-Snails in Pennsylvania," The Nautilus, Vol. 53, No. 3, 1940.

Stagnicola emarginata (Say)
Fossaria obrussa peninsulae (Walker)
F. modicella rustica (Lea)
F. exigua (Lea)
F. parva (Lea)
Helisoma anceps (Menke)
H. campanulatum (Say)
Gyraulus parvus (Say)
G. deflectus (Say)
Physa heterostropha (Say)
P. gyrina (Say)
Ferrissia rivularis (Say)
Campeloma decisa (Say)
Goniobasis virginica (Gmelin)
Anculosa carinata (Brug.)
Elliptio complanatus (Dillwyn)
Alasmidonta marginata susquehannae Ortmann
Sphaerium sulcatum (Lamarck)
S. solidulum (Prime)
S. striatinum (Lamarck)
Pisidium dubium (Say)
P. compressum Prime
P. abditum Haldeman

Of particular significance is the absence of any representation of the genus *Stenotrema*. Despite a diligent search on each field trip, the stenotremas were not to be found, although they should occur in Dauphin County according to known distributional facts.

The presence of *Alasmidonta marginata susquehannae* Ortmann in the Conewago Creek south of Hershey, Pennsylvania, constitutes a new locality record for this species, and indicates a southward extension of the range of this species. This species has also been taken from the Swatara Creek southeast of Bethel in Berks County, which is also a new locality record.

This paper is only a preliminary report on the molluscan fauna of Dauphin County and additional field work is expected to yield many additional species from this county.

Mr. Gordon K. MacMillan of the Carnegie Museum, and H. B. Herrington rendered invaluable assistance in the identification of the material from Dauphin County and the author here acknowledges his indebtedness to each.

NOTES AND NEWS

MENETUS COLORADOENSIS F. C. BAKER IN WYOMING.—A few specimens of this lately described and apparently rare species were taken by me July 30, last year, in Yellowstone National Park, Midway Geyser Basin, in a lily pond off Firehole River. It is a new record for Wyoming.—DOROTHY E. BEETLE.

HIRSUTE POLYGYRA MOOREANA (W. G. B.).—The presence of hairs on some examples of this species, first noticed by Strecker,

was doubted by Pilsbry (Vol. 1, p. 624 of the Land Mollusca of N.A.) ; but specimens taken by me at Hueco Springs, Comal Co., Texas; also some from Hwy. 237, just north of Warrenton, Fayette Co., Texas, under logs by side of road; now in my collection and that of the A.N.S. Phila., show many scattered hairs on the upper and peripheral surfaces.—Jack H. McLellan.

Viviparus contectoides in New York City.—Recently, a member of the New York Shell Club reported finding *Viviparus contectoides* W. G. B. in Central Park Lake, New York City. The President of the Club, Mr. Morris K. Jacobson, found that *Vivipara contectoides* was not reported before in New York City, or vicinity. It is not mentioned in any known lists of New York land and fresh water shells.

1. "Cat. of Moll. of Staten Island," Hubbard & Smith, Ann. Lyc. Nat. Hist. N. Y., vol. 8, no. 4–5, pp. 151–154 (1865).
2. "Report on Moll. of L. I., New York, and its Dependencies," Smith & Prime, Ann. Lyc. Nat. Hist. N. Y., vol. IX, pp. 377–407 (1870).
3. Bull. Brooklyn Conchological Club, vol. 1, no. 1., November, 1907.
4. "Fauna of New England," 13. "List of the Mollusca," C. W. Johnson, Occ. Pap. Boston Soc. Nat. Hist. (1915).

Twenty-five *Vivipara contectoides* were found in June, 1949. Also a recent search located four dead shells at the same spot (November, 1950) showing there must be some of them still growing in Central Park Lake.—Dorothy D. Freas.

Pallifera secreta (Cockerell).—In the latter part of June, 1950 I collected three specimens of a small *Pallifera* on mushrooms in the beech woods on the side of Roan Mtn., a half mile southeast of Carvers Gap, Mitchell Co., North Carolina, at an altitude of about 5000 ft. These slugs were small, about one-half inch long, gray-blue without spots, and were obviously immature. Although they did not have the spots mentions in Cockerell's description it seemed that they could be no other species than *Pallifera secreta.*

During the middle of September I again visited Roan Mtn. and stopped at the same locality. Three hours of leaf raking resulted in the finding of a series of about twenty specimens of all ages. The adults differed from the immature in being

lavender-brown in color. Two specimens had scattered small round black spots on the forward half of the mantle. Adults were 25 to 30 mm. in length when fully extended.

Three adult specimens were opened. The penis was very long, being about two-thirds the length of the body, and coiled in two loops, slightly swollen at the tip but not containing the fleshy body found in *P. marmorea* Pils. The spermathecal duct and oviduct were very slender.

In three specimens of *P. hemphilli* (W. G. B.), measuring 40 mm. in length preserved in alcohol, collected the same day at Roan High Bluff, the penis was short, about one-fourth the length of the animal, the end third bent at a right angle and greatly inflated, and without internal protuberences.—Leslie Hubricht.

The use of infra-subspecific names in Doctor de la Torre's essay on *Polymita,* reviewed in this number, will be of interest to specialists in nomenclature, as it is in accordance with the action of the International Commission on Zoological Nomenclature at Paris in August 1948 to add to the *Regles* or Rules a special nomenclatorial status for names given to infrasubspecific forms (e.g., aberrant, color, seasonal, male and other forms below the category of subspecies). The official proposal has been published in detail in the Bull. Zool. Nomen., vol. 3, paper I.C.(48)9, pp. 55–68, 1950, and its provisions are expected to become effective on Jan. 1, 1951. It will also be retroactive. The Rules will provide that a name given to any infra-suspecific form shall be co-ordinate with the name given to any other infra-subspecific form but not with names of subspecies and species. If a name originally published as an infra-subspecific form is elevated to subspecific or specific rank, it shall rank from the date on which it was so elevated and shall be attributed to the author by whom it was so elevated. In a change in the opposite direction, however (subspecies to an infra-subspecies), the name shall retain its original priority and author. Dr. de la Torre's names are clearly defined as infra-subspecific, but there are many doubtful cases in earlier publications, and it appears that some strange name-changing is in store for us. There are other cases which involve micro-races (or sub-species) such as Pilsbry's "varieties" of *Liguus* which are not comparable to individual variations or aberrations.

These infra-subspecific names were formerly merely latinized descriptive terms, but now they become valid taxonomic units. The geneticists have wisely used vernacular terms for their infra-subspecific forms of the fruit fly, *Drosophila,* such as "white eye," "forked bristle," and so forth. The flood gates will soon be open to those who must give a latinized name to everything they see, and we can foresee a host of new names not only in *Polymita* but in many marine groups. It will be interesting to see how long professional workers will refrain from plunging us into a new taxonomic era which will justify the existence of nomenclatorial experts for many centuries to come.—R. Tucker Abbott.

Two new molluscan records from the New York area.—In a projected revision of the molluscan fauna of New York City and vicinity, the New York Shell Club is happy to be able to list two records. The first is the presence of *Arion subfuscus* Draparnaud at Douglaston, Long Island. This slug was found on the Club's first field trip on May 15, 1949, but was not identified as *subfuscus* until it was dissected by Mr. Charles Bruce Lee of the University of Michigan. This determination was later verified by Dr. Aurele LaRoque of Ohio University. We are greatly indebted to these two gentlemen for their courtesy and efforts in our behalf. It is interesting to note that this importation from Europe was found living with a large colony of that other foreigner, *Cepaea nemoralis* (Müller).

In a letter of January 12, 1950 our member Mr. Leroy Wilcox of Speonk, Long Island, reported the presence of a *Helisoma* at Flander which was identified as *H. trivolvis marshalli* F. C. Baker by Dr. Harald A. Rehder of the National Museum. This is probably the first definitely localized record of this subspecies from New York. The type locality is Washington, D. C.

The same gentleman reported on June 6, 1950, that Mr. Latham of Orient, Long Island, wrote him in February of the discovery of a living six and one-half inch specimen of *Barnea costata* taken at Orient. This is the first record known to me of such a find on Long Island, although the farthest north record for this species alive is still the one published by Gould in the *Invertebrata of Massachusetts,* p. 37, of the colony discovered in 1845 at New Bedford.—Morris K. Jacobson.

ANOTHER MYTILUS HERMAPHRODITE.—In 1941, I described in this journal[1] a case of hermaphroditism in *Mytilus californianus,* with partial bilaterality of the sex organs. In an examination of several hundred additional specimens of this species, I have found another case; in this one the bilaterality being complete. The specimen was first seen emitting sperm, and was hence identified as a male. Soon thereafter, it was seen depositing eggs, and the former identification was attributed to error. Subsequently it was observed ejecting eggs from the (right) oviduct and sperm from the (left) spermiduct.[2] Dissection verified this observation. The left mantle lobe, from which all, or most of the sperm had been deposited, was colored a deep brick-red by carotenoid pigment, while the right lobe, which still contained some eggs, was dull brown. This pigment occurs abundantly also in the eggs, and some of it was undoubtedly present in the ovarian mantle lobe, but of insufficient amount to color the mantle deeply. The eggs and sperm were kept overnight in the battery jar in which they were deposited, and aerated, and the following day the jar contained a vast number of active larvae.—R. T. YOUNG, La Jolla, California.[3]

PUBLICATIONS RECEIVED

MOLLUSQUES TESTACÉS MARINS DE LA CÔTE OCCIDENTALE D'AFRIQUE. (Manuels ouest-Africains, vol. 2.). By Maurice Nicklès. 269 pp., 484 figs. Paul Lechavalier, 12, rue de Tournon, Paris 6e. 2800 francs (paper covers). 1950.—This manual of the marine shells of the west coast of Africa gives artificial keys to the genera, and ranges, brief descriptions and good pen-and-ink figures of the principal species. The generic nomenclature and arrangement mainly follow Thiele's "Handbuch." A rather unique feature is a glossary of Latin names. Although written especially for the "Colonists of west and equatorial Africa,"

[1] 1941, Naut. 54: 90–91.

[2] Both I. A. Field, 1922, Bull. U. S. Bureau of Fish., 38: 127–259, and K. M. White, 1937 "Mytilus," University Press, Liverpool, describe the sex ducts in *M. edulis* as opening on a common papilla, but in *M. californianus* they open separately.

[3] I am indebted to Dr. H. U. Sverdrup, Director of the Scripps Institution of Oceanography, for the privileges of the Institution during this study.

the book will be of assistance to conchologists everywhere.—H. B. B.

Egg capsules and development of some marine prosobranchs from tropical West Africa. Atlantide Report No. 1. Copenhagen, 1950.—The capsules, veligers or embryonic shells of many species of *Crepidula, Natica, Murex, Marginella, Nerita, Conus,* and other genera are described and figured. "Broadly speaking, it can be stated that prosobranch eggs with a diameter of about 400μ [.4 mm.] or more will have their pelagic stage suppressed, thus having a non-pelagic development. On the other hand, egg diameters less than 200μ will in most cases give pelagic development. There are however exceptions, especially in species which have nurse eggs." The subject has not had much attention on our shores, and this paper may serve to stimulate an interesting study, of importance also in relation to dispersal. H. A. P.

New York Shell Club Notes, No. 3, Sept. 1950, is a mimeographed 5 page leaflet containing reports of field trips and other activities of the Club. An interesting contribution to the history of former shell clubs by the Secretary, Dorthy D. (Mrs. Allen L.) Freas, gives an account of the Bulletin of the Brooklyn Conchological Club, 1907. This short-lived club was one of several forerunners of the AMU.

The land snails of West Virginia (Ann. Carnegie Mus., 31: 89–238, pls. 1–15, 1949). By Gordon K. MacMillan.—A valuable contribution to the knowledge of the distribution of the land snails of West Virginia. The author has compiled an impressive list of records of occurrence that is perhaps unequalled for any other state. *Mesodon thyroidus* for example is listed from 111 localities. Of particular help to local students are the descriptions of each species which are drawn for the most part from the original descriptions. With few exceptions the figures composing the fifteen plates are excellent. (Pl. 13, figs. 3–4 are of *Gastrodonta fonticula* rather than *G. interna* as indicated.) It is hard to understand why the author used only the shell as a basis of classification as it results in some peculiar anomalies. *Triodopsis albolabris* and *Allogona profundus* are thus included in *Mesodon.* Even using conchological characters alone the sequence of Helicinidae, Cionellidae, Haplotrematidae, Pomatiop-

sidae is not logical. The intermingling of Prosobranchiata and Pulmonata must have been an oversight. This paper will be a genuine aid to students of the snails of West Virginia.—Charles B. Wurtz.

El genero Polymita. [The genus *Polymita*.] By Carlos de la Torre y Huerta. Memorias Soc. Cubana Hist. Nat. "Felipe Poey," vol. 20, no. 1, pp. 1–20, pls. 1–11. August 25, 1950. (Published posthumously with a preface by Isabel P. Farfante.)—The lifelong study of the Cuban genus, *Polymita* Beck 1837, by Dr. de la Torre, has been published with a magnificent set of colored plates depicting nearly 200 shells and animals in their natural colors. This work should prove welcome to the many amateurs interested in this popular and colorful group. The text is in English and Spanish. To future scientific workers interested in speciation and geographical distribution, the illustrations will be an invaluable tool. It is surprising into how few pages the author was able to condense the wealth of information at his command. Six new subspecies and a new subgenus (*Oligomita*) are described and figured, and 31 infra-subspecific varieties are illustrated without description. The name *P. muscarum* Lea, 1834, is used instead of *P. globulosa* Férussac, 1820, despite the fact that the latter is not preoccupied by *globulosa* Benz (in C. H. de Zieten) 1832 or Wood 1828. Future workers on this genus will have to contend with the decision of 1948 on the invalidity of the infra-subspecific forms which are introduced by name and figure only. The infra-subspecific varieties of *versicolor,* proposed by Beck in 1837 (Index Moll., p. 45), appear to be valid, however, since they appeared before 1930. The form *minor* on Torre's plate 10, figs. 6, 9, 10 should be credited to Beck, or if credited to Torre, then considered a homonym. Beck's infra-subspecific form *major* is also valid, but students of *Polymita* will have to ascertain to which form it applies. Students who exchanged with Dr. de la Torre may now revise their collections and eliminate a number of manuscript names which were not employed in the final draft of this paper.—R. Tucker Abbott.

Estudio anatómico del género Polymita Beck. [An Anatomical Study of the Genus *Polymita* Beck.] By Abelardo Moreno. Memorias Soc. Cubana Hist. Nat. "Felipe Poey," vol.

20, no. 1, pp. 21–35, pls. 12–22. 1950.—A very thorough and well-illustrated study is presented of the genitalia of the six known species of *Polymita* and of several of their subspecies and infra-subspecific forms. Micro-photographs are given of cross-sections of the dart sac in one species. Valid differences in the anatomy are indicated at least at the species level.—R. Tucker Abbott.

Speciation in ancient lakes. By John Langdon Brooks. The Quarterly Preview of Biology, **25**: 30–60, 131–176, many text figures. 1950. —There is an extensive literature on speciation through isolation by topographic, climatic, ecologic or other barriers on land areas, but the problem of the evolution of flocks of allied species in lakes is more involved. This attempt at a solution is based upon all of the aquatic life but chiefly upon the small Crustacea and to some extent on the Mollusca and other animals and plants. The author relies mainly upon late geological action such as: 1, subdivision of the lake into large basins with subsequent amalgamation. 2, formation of small peripheral lakes with subsequent reincorporation. 3, long coastline with large, ecologically isolated stretches. During the isolations the populations would undergo genetic changes often of sufficient magnitude to effect reproductive isolation when the geographic isolation breaks down.—H. A. P.

Illustrated glossary of Gastropoda, Scaphopoda, Amphineura. By Beatrice LaRue Burch. Minutes 105, Conchological Club of Southern California. 55 pages, 111 figures. $1.50. 1950.—This careful glossary should be of great help in the understanding of technical terms, especially of those of the shell. But the addition of a "d" to adjectives ending in "ate," etc., should be avoided; e.g., coronate (ex coronatus, meaning crowned) not "coronated" (crowneded); also umbilicate, not "umbilicated." As is not surprising, when one considers the conflicting usages and the superfluity of synonyms, the definitions of the soft parts do not attain quite the same excellence. Incidentally, *Hendersonia,* although pulmonate (developing a lung), is an aberrant genus of the Prosobranchia (Rhipidoglossa) and has little in common with the pulmonate mollusks (Pulmonata).—H. B. B.

THE NAUTILUS

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A NEW CARIBBEAN MOLLUSK

By H. A. PILSBRY and A. A. OLSSON

CHIONE (CHIONOPSIS) PINCHOTI, **new species.** Plate 9, figs. 7, 8.

Shell for this group small (average length about 23 mm.), subtrigonal, quite plump, the diameter about 60–63 percent of the length; inequilateral, the posterior side a little longer, bluntly pointed at the end. The color is white throughout, or the lunule and escutcheon may be chestnut-brown or with flamules of that color on the escutcheon. Surface sculpture is elegant, formed by numerous (about 20 to 23) narrow, nearly equally spaced low concentric lamellae with radial riblets or cords in their interspaces, a pattern roughly similar to that of *C. amathusia* but much finer. The detail of the sculpture is complex, but somewhat as follows: from the umbo to about a third of the height there are low concentric ridges and simple radial riblets in their intervals. At this point, in the middle area of the valve, the radial riblets appear to double suddenly and a third smaller thread is introduced in their intervals. With growth, the two branches of the primary riblets and the third intercalary attain approximate size so that on the ventral half of an adult shell, the surface across the middle segment is covered with small, equal, close-set radial riblets or cords which appear also on the ventral faces of the concentric lamellae; the posterior area is sculptured throughout by larger and simpler riblets. The lunule is large, cordate, rather strongly ribbed. Escutcheon lanceolate, smooth except for growth lines. Interior white, flushed with warm buff towards the beak cavity. The lunular and ventral margins are finely crenulated throughout. There is a small, moderately deep, triangular pallial sinus.

Length 24.5 mm., height 20.5 mm., diameter 16.7 mm. Type, fig. 8.

Length 22.3 mm., height 19 mm., diameter 14 mm. Fig. 7.

This small *Chione* was dredged in some abundance by the senior author while on the Pinchot Expedition, in Limon Bay, near Colon, Panama. The type and figured paratype are 187194 ANSP. Other paratypes have been deposited in the U. S. Nat. Mus., M.C.Z., and Cal. Acad. Sci.

Although evidently this is a very common species in the recent fauna, it has so far not shown up as fossil in the Pleistocene beds surrounding Limon Bay, from which several mollusks were described by Dall and Pilsbry.

The small size of this species recalls certain Miocene forms such as *Chione walli* Guppy from Trinidad, *C. paraquanensis* Hodson from Venezuela and *C. propinqua* Spieker from Peru.

Chionopsis Olsson [1] (type *Chione amathusia* Philippi), is mainly Pacific in distribution at the present day, but with numerous fossil species in the Caribbean-West Indian region. It differs from typical *Chione* (type *C. cancellata* L.), by its thinner, more inflated shell, the well crenulated lunular margin, deeper pallial sinus and certain hinge characteristics. *Gnidiella* Parker [2] (type *Venus gnidia* Brod. & Sby.), is a synonym of *Chionopsis.*

NEW DEEP-WATER OLIVELLAS FROM FLORIDA, WITH NOTES ON THE O. JASPIDEA-NIVEA COMPLEX [1]

By R. TUCKER ABBOTT

Associate Curator, U. S. National Museum

Recent dredgings made off Miami and Key Largo by Messrs. F. M. Bayer and Gilbert L. Voss on the University of Miami Biological Laboratories launch "Megalopa" have brought to light two small species of *Olivella,* which apparently have not been described. These two species were also represented abundantly in the numerous dredging hauls of J. B. Henderson's yacht,

[1] Olsson, A. A., 1932, The Peruvian miocene. Bulls, Amer. Paleontology, vol. 19, p. 111.

[2] Parker, P., 1949. Fossil and recent species of the pelecypod genera Chione and Securella from the Pacific Coast. Jour. of Pal., vol. 23, no. 6, p. 582.

[1] Published by permission of the Smithsonian Institution.

"Eolis." I am appending to these descriptions a few remarks to clarify the identities of *O. watermani* McGinty, *O. jaspidea* (Gmelin), *O. nivea* (Gmelin) and *O. mutica* (Say).

Olivella bayeri, **new species.** Plate 7, figs. 2a-b.

Description.—Adults 6 to 9 mm. in length, elongate, rather thin, glossy, translucent with faint brown markings, and with 4 to 5 whorls. Nuclear whorl of one revolution, large, moderately bulbous, glassy-smooth, translucent, and separated from the postnuclear whorls by a fine, axial line. Postnuclear whorls 3 to 4, slightly convex, smooth, translucent, clear tan in live specimens to milky white in dead specimens. Suture distinct, deeply and finely canaliculate. Most of the channeling is on the inner edge of the top of the whorl, although there is a small amount of concave etching against the side of the preceding whorl. Aperture elongate to lanceolate, about 6/10 the total length of the shell, narrow posteriorly, and continuous with the deep sutural channel. Outer lip thin, sharp, and projecting considerably downward at its lower and outer, rounded corner. Inner lip smooth with a very indistinct, elongate, clear-colored callus which is thickest in specimens over 6 mm. in length. It is often microscopically scratched with numerous, short, wavy, axial lines. The area of the anal fasciole is bounded above by a finely raised thread. The columella below this line is evenly and shallowly S-shaped. The lower fourth of the columella is very slightly thickened into a single, raised, rather wide, spiral plication. In thicker specimens, there is often a tiny, weaker and narrower plait just above. Color of anal fasciole usually white, but occasionally with a spiral series of weak, brown spots. Color pattern on body whorl variable, usually indistinct, with small, irregular, light-brown spots just below the suture and just above the anal fasciole thread. Sides of whorls irregularly painted with inter-connecting streaks and flamules of light-brown. In most specimens, especially dead ones, milky whiteness obscures the color. Operculum thin, translucent yellowish, horny, sickle-shaped to lanceolate, with smooth edges, and slightly larger than the aperture of the shell.

The mean length of adults varies considerably in the various dredging samples. At nine stations (from off Fowey Light south about 30 miles to Molasses Reef, Key Largo), adults rarely exceeded 7.0 mm. in length, while the majority of 98 dredging stations, mainly "Eolis" (from Miami to Key West) contained adults 8.0 to 11.0 mm. in length.

Measurements in mm.

Length	Width	Aperture		
9.0	3.8	5.0×1.7	Holotype.	"Eolis" Station 369
11.0	4.0	5.7×2.0	Paratype.	"Eolis" Station 369
3.6	1.8	2.3×0.9	Paratype.	(young) Station 369
7.0	2.7	3.8×1.3	Paratype.	"Megalopa" Station 21
7.0	2.9	4.0×1.3	Paratype.	"Megalopa" Station 21

Type locality.—About 3 miles off Ajax Reef, off Elliott's Key, Lower Florida Keys, Florida. 80 to 100 fathoms. August 1917. "Eolis" station 369.

Types.—The holotype from the above locality is in USNM 595132. Paratypes from the same lot are in USNM 412871; also in the Mus. Comp. Zoöl. (Harvard), the Academy of Natural Sciences (Philadelphia), and the Biological Laboratories of the University of Miami (Florida).

Range and records.—From off Lake Worth to Key West. I have examined and used in describing this species specimens from 105 dredging stations, but will list only a few: (UM = Univ. Miami Biol. Lab. M/V "Megalopa." F. M. Bayer, legit. July 1950). UM–14, 3 mi., 150° from Molasses Reef, off Key Largo, 73 fms.; UM–21, 3 mi., 100° from Carysfort Reef, Key Largo, 78 fms.; "Eolis" 174, E.N.E. off Fowey Light, Miami, 58 fms.; "Eolis" 302, off Sand Key, 100 fms.; "Eolis" 384, off Key West, 75–80 fms. The depth ranges in the 94 "Eolis" stations were from 25 to 118 fms., with most larger lots occurring around 75 fms.

Remarks.—Several species approximate the characters of *O. bayeri* but none has the combination of bulbous nuclear whorls, elongate, fragile shell, almost smooth lower columella, and semi-translucent texture of the shell. *O. blanesi* Ford from northern Cuba and the Bahamas is a shallow-water species with a completely smooth lower columella, with a deeper, more concave arch in the lower part of the columella and with a heavier, more squat shell. This species is named for Frederick M. Bayer of the United States National Museum.

Olivella moorei, **new species.** Plate 7, figs. 1a–b.

Description.—Adults 7 to 8 mm. in length, moderately elongate, rather thin, glossy, translucent with bright dark-brown

axial streaks, and with 4 to 5 whorls. Nuclear whorl of one revolution, large, quite bulbous, glassy-white. Postnuclear whorls flattish above, moderately convex below, gradually descending. Sutural channel deep, very narrow; and the side of the preceding whorl is not etched. Aperture lanceolate, constricted above, wide and open below, and about 6/10 the total length of the shell. Outer lip thin, sharp, very slightly turned inward near the upper third, and projecting slightly downward at its lower, outer corner. Inner lip smooth, with or without a weak, elongate, glazed columellar callus which is often microscopically scratched with fine, sharp threads. Anal fasciole bordered above by a single, fine spiral thread. The columella below this line has an abrupt, angular S-shaped indentation. Base of columella swollen into a rather wide, large twisted fold. Anal fasciole white with a few short spiral brown bars. Color of whorls translucent with a small, solid, spiral band of light-brown just below the suture and numerous long, wavy, axial flammules of reddish brown on the sides. Interior of aperture white, sometimes faintly tinted with tan. Operculum similar to *O. bayeri*. Verge in males vermiform, about as half as long as the shell.

Measurements in mm.

Length	Width	Aperture	
7.5	3.0	4.0×1.4	Holotype, UM Station 20
7.0	2.9	3.9×1.2	Paratype, UM Station 20
8.0	3.6	4.3×1.6	Paratype, "Fish Hawk" 7280

Type locality.—3 miles, 100° from Carysfort Reef, off Key Largo, Florida. 112 fms., July, 1950. Univ. Miami Biol. Lab. M/V, "Megalopa" station 20.

Types.—The holotype from the above locality is in USNM no. 595133. Paratypes from the same locality in USNM 595134; also in the Mus. Comp. Zoöl. (Harvard), the Acad. Nat. Sci. (Philadelphia) and the Univ. Miami Biol. Lab. (Florida).

Range and records.—Off Key Largo to Key West, 115 to 125 fms. Other paratypes from: UM–18, 6 mi., 135° from Molasses Reef, off Key Largo, 122 fms; UM–19, 5½ mi., 127° from Molasses Reef, 120 fms; off Sand Key, "Eolis" sta. 316, 120st fms; off Sambo Reef, "Eolis" stations 329, 330, 331, 332, in 135, 120, 118, and 115 fms., respectively; off West'n Dry Rocks, "Eolis" sta. 341 in 144 fms; off Key West, "Fish Hawk" sta. 7280, 132 fms.

Remarks.—*O. moorei* is closest to *O. strigata* Reeve, 1850, from the "West Indies," the latter, however, being a larger, much more squat species with a light-brown aperture. *O. moorei* is sometimes dredged with *O. bayeri* in depths below 110 fathoms, and can be distinguished from it readily by the longitudinal brown streaks, less elongate spire, thicker fold at the base of the columella, and the less obvious suture. This species is named for Dr. Hilary B. Moore of the University of Miami Biological Laboratories.

The bathymetric ranges of the off-shore *Olivella* appear to be rather distinct for each species. From the more than 100 dredging stations represented in the U. S. National Museum collection, *O. nivea* occurs from shore to 25 fathoms; *O. bayeri* occurs from 25 to 122 fathoms, and *O. moorei* from 115 to 144 and probably deeper.

Olivella watermani McGinty. Plate 7, figs. 5a–b.

Olivella watermani McGinty, 1940, The Nautilus, vol. 54, no. 2, p. 64, pl. 3, figs. 4 and 5 (off Palm Beach, Florida).

Description.—Adults varying from 9 to 12 mm. in length, whorls 4 to 6. Nuclear whorl smooth, glassy-white, moderately bulbous, exserted. Sutural canal deep, not very narrow. The wall of the preceding whorl is strongly and concavely etched opposite the sutural canal. Upper series of plaits on columella 5 to 7, usually 5, and separated from the lower series of 4 to 5 plaits on the base of the columella by a shallow U-shaped constriction. On the inside of the outer lip in most specimens, there is a series of indistinct, raised, spiral, cord-like thickenings.

Range and records.—Off Palm Beach to Key West, Florida from 28 to 100 fathoms. In the majority of the 91 dredging stations from which we have specimens, the largest series came from depths of 50 to 70 fathoms. One of Dall's paratypes of *Olivella jaspidea* var. *rotunda* from off Sombrero, 72 fms., is this species. Typical *rotunda* is extremely close, but seems to differ in having a longer aperture, very bulbous callus on the upper part of the parietal wall and in having an axial color pattern.

Olivella jaspidea (Gmelin). Plate 7, figs. 3a–b.

Voluta jaspidea Gmelin, 1792, Systema Nat. 13th ed., p. 3442, no. 21 (refers to Lister Conch., t. 726, f. 13a and to Martini Conch. Cab., vol. 2, t. 50, f. 556) ("in mari hispanico").

Both of the figures referred to by Gmelin are admittedly poor, but I think the character of the color-marked anal fasciole and the shell's general shape are sufficient to identify the name *O. jaspidea* with our common West Indian species. The nuclear whorl in Martini's figure is depicted as large, although no great weight can be put on the accuracy of his artist. This species is commonly confused with *O. nivea.*

Description.—Adults 10 to 18 mm. in length, whorls about 5; *apex blunt; nuclear whorl large* and rather bulbous, white. Sutural channel moderately deep, narrow; *without an etched spiral indentation* on the side of the preceding whorl. Surface of shell moderately glossy, with fine axial growth lines. Plaits on upper two-thirds of columella absent or very weak. Base of columella with about 4 rather strong, variably-spaced plaits. Color of shell variable, usually grayish white with small, dull maculations of purplish brown. *Fasciole colored* with irregular brown spots and bars.

Range.—Southeast Florida, south through the Antilles to Barbados. No Bahama or Gulf of Mexico records.

A darker, more squat subspecies occurs from Curacao and Aruba to Barbados. It is probably *O. conoidalis* (Lamarck), 1811.

Olivella nivea (Gmelin). Plate 7, figs. 4a–b.

Voluta nivea Gmelin 1792, Systema Nat., 13th ed., p. 3442, no. 22 (refers to Martini, Conch. Cab., vol. 2, t. 50, f. 558 and for his var. B, t. 50, f. 557) ("in mari hispanico").

Martini's figure 557 is an adequate representation of our common Florida and West Indian species, and I have seen specimens which very closely duplicate the same color pattern. The fasciole is colorless. Figure 558 is probably a bleached or white specimen of this species.

Description.—Adults 10 to 25 mm. in length, whorls about 7, *apex pointed,* sharp; *nuclear whorls small,* white, tan or purple. Sutural channel deep, fairly wide; *with a strongly*

concave, etched, spiral indentation on the side of the preceding whorl. Surface of shell very glossy. Plaits on upper two thirds of columella strong, 6 to 8. Base of columella with about 4 to 6 not too strong, variable plaits. Color of shell variable, usually cream-white with orangish, tan or purple markings occurring in clumps in a spiral series just below the suture and just above the fasciole. *Fasciole lacks color,* except for a yellowish tint in fresh specimens.

Range.—Bermuda, southeast Florida, the Bahamas, the Antilles and the Gulf of Mexico north to Yucatan (and Texas?).

Olivella mutica (Say)

I would like to point out that Tomlin (Nautilus, 1934, vol. 48, p. 71) was probably unwise in suggesting that *Porphyria minuta* Link, 1807, was an earlier name for our common eastern species, *O. mutica* Say, 1822. Link's name is based on Martini's Conch. Cab., vol. 2, pl. 50, f. 545, which is a West Indian species. It is much fatter than *O. mutica,* with axial zigzag color lines on the outer shell and on the inside of the inner lip, and whose columella is cut-away or narrowed sharply at the base.

EXPLANATION OF PLATE 7

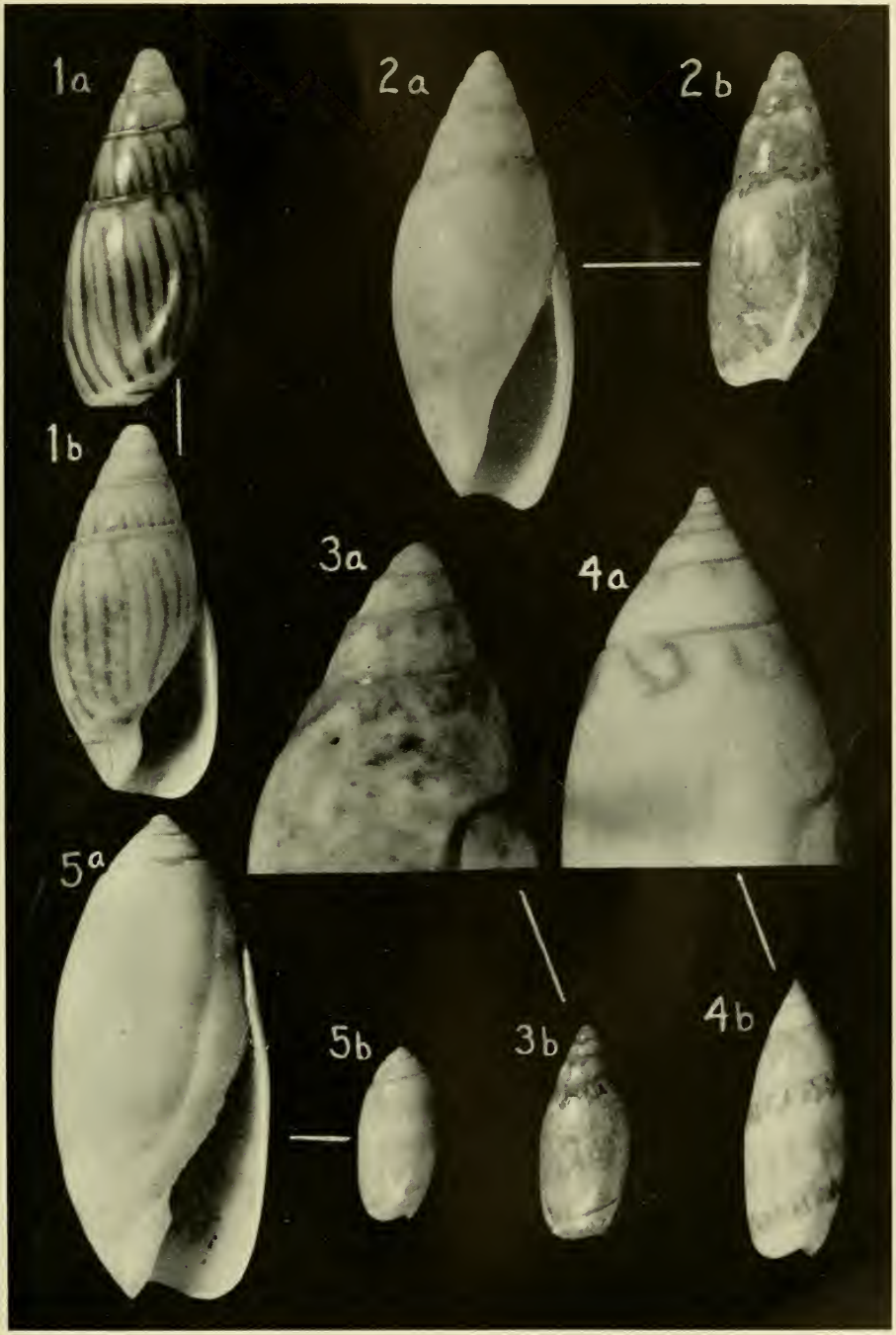
Fig. 1. *Olivella moorei* Abbott. a, holotype. b, paratype (both × 6).
Fig. 2. *O. bayeri* Abbott. a, holotype. b, paratype (both × 6).
Fig. 3. *O. jaspidea* (Gmelin). a, spire × 6. b, shell × 1½.
Fig. 4. *O. nivea* (Gmelin). a, spire × 6. b, shell × 1½.
Fig. 5. O. *watermani* McGinty. a, front view × 6. b, × 1½.

NEW MARINE MOLLUSKS FROM BRITISH WEST INDIES AND FLORIDA KEYS

By JEANNE S. SCHWENGEL

Crassispira drangai, new species. Pl. 8, fig. 1.

Shell elongately turrite, blackish brown, with deep livid brown between the ribs on the periphery of the body whorl. Apex missing, eleven slightly bulging whorls, encircled with a single keel on the upper part, concavely depressed above and below the keel. Striae encircle this sulcus, slightly undulating above the keel to conform to the uneven suture, heavier and farther apart below. Longitudinally ribbed beneath; ribs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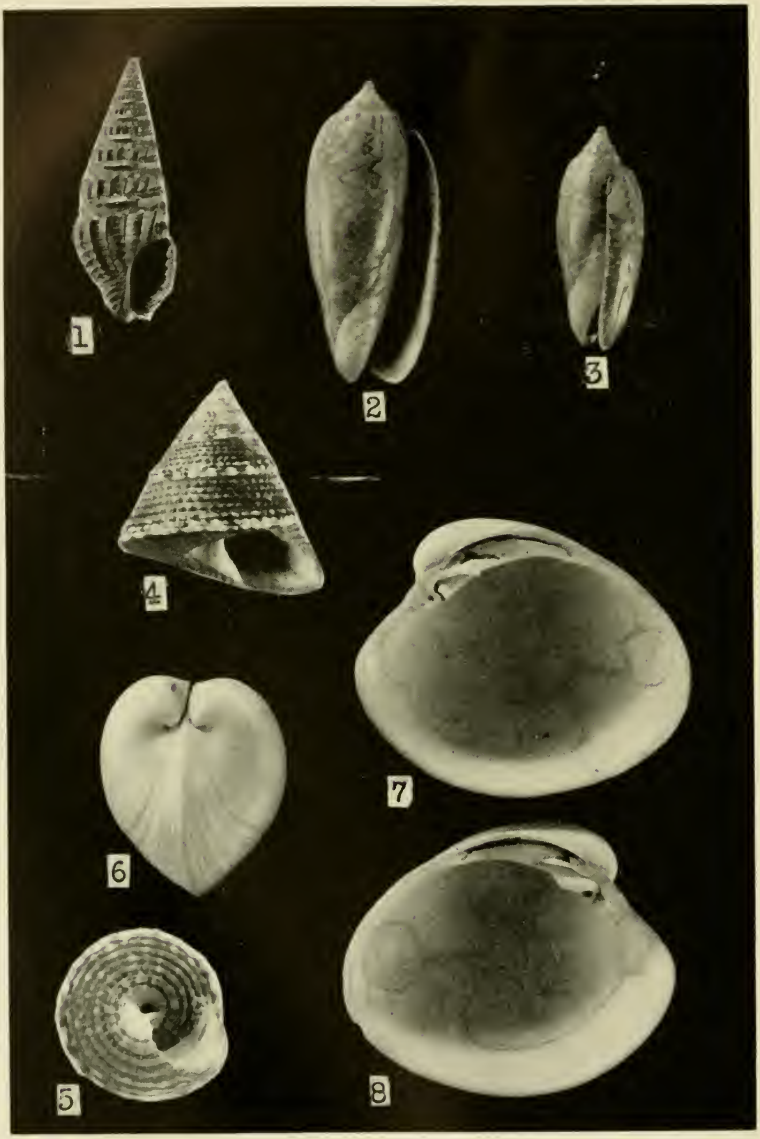


FIG. 1, *Crassispira drangai*. 2–3, *Oliva drangai*. 4–5, *Calliostoma jujubinum adelae*. 6–8, *Pitaria cordata*.

slightly oblique and ranged with great regularity, the interstices wider than the ribs. Suture inconspicuous and appressed. A heavy, rounded varix some distance back from the lip.

Entire shell transversely striate; three or four heavy spiral lines on each whorl, with three to five finer lines between each heavy line. Incremental lines faintly perceptible, except over the sulcus, where they are stronger, where they are convex below the keel and above the shouldered axial ribs. These ribs, which are farther apart on the body whorl, gradually flatten out on the final third of the whorl. On the central third of the body whorl only, the longitudinal ribs become slightly knobbed where heavier spiral lines cross the ribs.

Aperture slightly more than one-third the length of shell, narrow, smooth within. Strong callosity above the anal sinus; outer lip thin, crenulated. Siphonal sinus moderately deep, subtubular; columella straight; slight umbilical chink where the callus lifts from the pillar.

Length 12½ mm.; width 6½ mm.; length of aperture 5½ mm.

Type in author's collection.

Locality; Hastings, Barbados, British West Indies.

This shell is very similar, at first glance, to *Drillia ebenina* Dall. It differs in the greater number of whorls; greater comparative width; the presence of fewer spiral striae on each whorl, and the addition of finer spiral lines between each of these heavier lines. The anal sinus is much deeper and the callus on the pillar is more pronounced, producing a small but definite umbilical chink at the base.

This shell was collected by Ted Dranga and named for him in appreciation of his wonderful help and patience in teaching the author the first steps in the collecting and care of marine mollusks.

Oliva drangai, **new species.** Pl. 8, figs. 2–3.

Shell subcylindric, highly polished. Ground color primrose yellow, body whorl tinted with lines of walnut brown, fading toward the anterior end into a cream buff, with tinting barely discernible. Spire moderately high, with nucleus glassy, opaque, exserted, about three whorls, the following five whorls revolving; channeled suture; body whorl seven-eighths the length of the shell. Columella sloping sharply to the notched base. Callus obliquely plaited; interior of shell creamy white. Walnut brown markings on inner edge of lip.

Length 45 mm.; diameter 18 mm.
Length 30 mm.; diameter 12 mm.
Type No. 187428 ANSP, Co-type in my collection.

This *Oliva* differs from *O. sayana* Ravenel by its larger and more produced nucleus; its lack of tassel-like dark lines at the suture of the body whorl; its more sloping columella and the complete lack of color bands around the body whorl. The shells were collected by Ted Dranga at Pigeon Point, Tobago, British West Indies, and are named for him in recognition of his many years of fine and discriminating collecting, all over the world.

PITARIA CORDATA, **new species.** Pl. 8, figs. 6–8.

Shell equivalve, chalky-white, sub-ovate, very convex. Sculpture of heavy, uneven, concentric growth-wrinkles, converging anteriorly into a feebly defined, cordate lunule. The low, prominently rounded umbones are almost smooth, shiny, and incurved over the lunule; and the shell, when viewed anteriorly, is beautifully heart-shaped.

Anterior slope short and straight, the end moderately rounding into an evenly arcuate ventral margin. Posterior end broadly rounded; in the adult, slightly more produced. The dorsal margin is slightly rounded; in some specimens almost straight. Ligament narrow and slightly depressed. Umbones narrowly and deeply separated.

Interior of shell white, lip slightly crenulate. Posterior adductor impression close to border and almost round; pallial sinus sharply triangular, ascending deeply; pallial line very clearly defined; anterior adductor impression long pear-shaped, ending close to margin.

Length 44 mm.; heighth 32 mm.; breadth 33 mm.
Length 35 mm.; heighth 34½ mm.; breadth 25 mm.
Locality: West of Dry Tortugas, Florida, in 20 fathoms.
Type No. 187430 ANSP.

These shells were sent to the author by Ted Dranga, who acquired them from the shrimp fisherman at Key West. Specimens have also been received from Adele Koto, collected in the same approximate locality.

This shell is about the same shape and size as *Callocardia* (*Agripoma*) *morrhuana* Linsley, differing in its greater convexity, more rounded and recurved beaks, and larger pallial

sinus, which is sharply triangular and ascends farther toward the center of the shell.

CALLIOSTOMA (EUTROCHUS) JUJUBINUM ADELAE, **new variety.** Pl. 8, figs. 4–5.

Shell conical, nearly as wide as high. Nucleus minute, glassy, of about 1½ whorls; followed by 8 body whorls; base flat, becoming slightly rounded at the aperture.

Color chamois with white and chocolate markings on the two heavily beaded lirae at the base of each whorl. Rarely a specimen is walnut-brown with the same white and chocolate markings.

Sculpture consists of elevated spiral, bearded lirae; beginning with two on the first whorl and gradually increasing to four on the last whorl; with a faintly bearded lirae being added as the whorl nears the outer lip. At the base of each whorl are two projecting and heavily beaded lirae. Base is flat, unicolor, with eight or nine beaded lirae; the lirae next the funnel-shaped, white umbilicus has fewer and heavier beads. Aperture almost the same as in *C. jujubinum* Gmelin, being quadrate; oblique outer lip, five or six lirate within; basal lip straight and strongly five or six lirate within; columella arcuate, partially overshadowing the umbilicus, ending below with a point or tooth. Aperture white, except for outer lip, which is beautifully iridescent in live specimens.

Alt. 15 mm.; dia. 14½ mm.

Locality: Indian Key, Florida.

Type No. 187203, ANSP. Co-type in author's collection.

This variety differs from *C. j. perspectivum* Philippi especially by the two heavily beaded projecting lirae at the base of each whorl, and the presence of fewer spiral lirae on the whorls. It was collected by and named for, Adele Koto, one of our finest amateur collectors.

NEW SPECIES OF AMNICOLA AND STREPTOSTYLA

BY H. A. PILSBRY

AMNICOLA SABLENSIS, **new species.** Pl. 9, figs. 1–1c.

The shell is umbilicate, ovate-conic, corneous, of 5⅓ whorls; the apex rather acute; early whorls strongly convex, the last two less convex. The surface is smooth. The aperture is ovate,

its length contained 2⅓ times in that of the shell. The peristome is continuous but normally adnate to the preceding whorl and very thin for a short distance above the umbilicus.

Length 3.33 mm., diameter 2 mm.; length of aperture 1.45 mm.

West Lake near Cape Sable, Florida. J. A. Weber, T. L. McGinty. Type and paratypes 185190 ANSP. Other paratypes in Weber and McGinty collections.

This species is very much like *A. sanctijohannis* Pils., widely spread in Florida, but it differs by the more acute apex and the weaker convexity of the later whorls. The type (fig. 2) and a paratype of *A. sanctijohannis* are shown for comparison in plate 9, figs. 2, 2a, No. 69461 ANSP.

The largest specimen in two lots of *A. sablensis* received is 5.2 mm. long, with 6 whorls, the last one somewhat more convex than in other specimens; evidently an unusually old shell (fig. 1c).

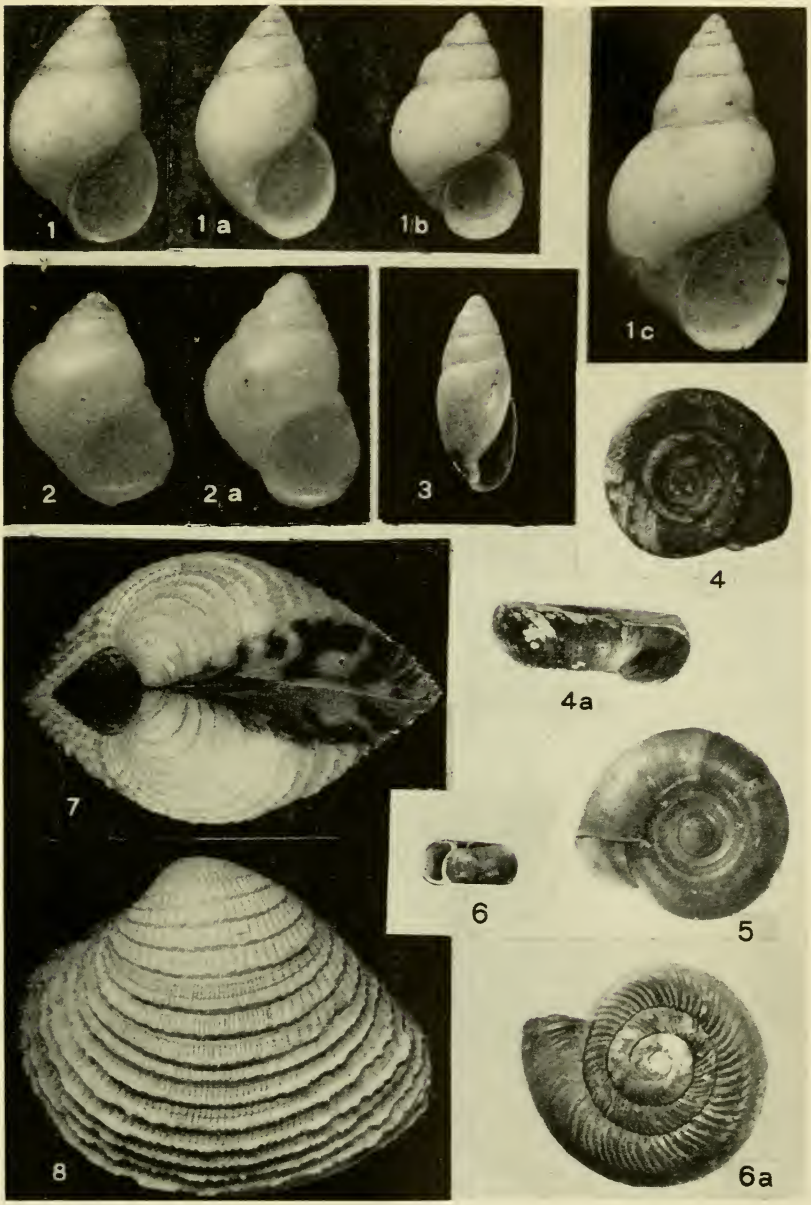
Streptostyla jacobsoni, **new species.** Plate 9, fig. 3.

The small shell is somewhat fusiform, the diameter somewhat less than half the length of the shell. The apex is obtuse, outlines of the spire slightly convex, the whorls increasing slowly, slightly convex. The surface is glossy and marked irregularly and very weakly with forwardly convex lines of growth. The aperture is nearly half as long as the shell, very narrow in the upper half, the columella deeply concave above, and with a strongly convex lobe below, which is obliquely truncate at the base. The outer lip arches forward a little below the middle, being straight and receding above and below.

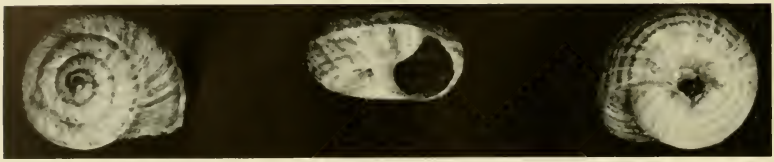
Length 10.8 mm., diameter 4.5 mm., length of aperture 5.3 mm. 7 whorls.

Kilometer 636, on the road between Santa Inez and Llera, state of Nuevo Leon, Mexico. Type and paratype 187058 ANSP, collected by Mr. M. L. Jacobson; other paratypes in his collection.

With about the size and figure of *S. meridana* (Morelet), this species differs entirely by its short, strongly twisted columella. By the deep concavity of the columella above, it differs from *S. minuta* Pils.



1–1c, *Amnicola sablensis*. 2–2a, *A. sanctijohannis*. 3, *Streptostyla jacobsoni*. 7–8, *Chione pinchoti*.



Upper 3 figs., *Jacosta caperata.* Lower fig., *Vexillum willcoxi coxianum.*

A NEW VEXILLUM FROM PLIOCENE OF ST. PETERSBURG, FLORIDA

By WILLIAM G. FARGO

Vexillum (Uromitra) willcoxi coxianum, **new subspecies.** Plate 10, lower figure.

Shell small, subfusiform, solid, the spire slightly inflated about 2½ times the height of the aperture. The general form of the conch somewhat pupoid. Protoconch is relatively large, blunt at the apex and composed of about 1½ smooth whorls which enlarge rapidly and become globular. The whorls of the conch form turreted, subcylindric, glossy spire neatly sculptured by widely spaced (9 on the early whorls, 8 on the later ones) axial riblets which are narrow, slightly protractive and swollen behind near the suture. On the early whorls, the primary ribs are irregular in form and spacing, more arcuate and protractive than on the last three whorls. On the later whorls, a reticulated pattern in their interspaces is formed by 4 or 5 rows of squarish pits, spirally and axially arranged. The spaces between the rows of pits are slightly raised indicating that they lie between intersecting spirals and axial riblets which have become almost wholly obsolete, but true, well-formed spiral sculpture is present on the base and pillar where 4 or 5 revolving cords override the primary ribs.

The holotype, ANSP 17376, has 7 lirae inside the outer lip and 3 folds on the columella. It measures as follows: Length, 8.1 mm., length of last whorl, 4.9 mm., length of aperture, 3.4 mm.; diameter, 2.5 mm.; whorls, protoconch 1½, conch, 5½. A larger specimen is 9.1 mm. long and 2.8 mm. in diameter. There are 8 specimens available from the North St. Petersburg Pliocene.

While *V. willcoxi coxianum* is of similar size and has apertural features like *V.* (*Uromitra*) *willcoxi* (*Dall*) * which also occurs with it in the St. Petersburg Pliocene and at Fort Thompson of the Caloosahatchee, it differs in having 8 or 9 ribs instead of 10–13, which in *willcoxi* are close-set, linear and regular, not markedly enlarged behind. Typical *willcoxi* from both of these Florida localities have only a minor or fortuitous indication of the remarkable pitted sculpture which principally characterizes *coxianum*. A few specimens intermediate between

* Trans. Wagner Free Inst. Sci., v. 3 (1890–1903); p. 93, pl. 3, fig. 10. See also Nautilus, v. 61 (1948) pp. 109–112, pl. 7, figs. 9 and 10.

willcoxi and *coxianum* from both of the above Florida localities have been found. The new subspecies is named for its discoverer, George H. Cox, M.D., of New Glasgow, Nova Scotia.

A NEW SUBSPECIES OF AMMONITELLA

By E. P. CHACE

Among some shells collected near Boyden's Cave, Kings Canyon, Fresno County, California, last fall were a number of specimens of an *Ammonitella*. At first glance, they seemed to be *A. yatesi* (J. G. Cooper), which is known only from a small district in Calaveras County, 125 miles farther north. But upon comparing them with shells from that district, certain differences seemed sufficiently constant to justify a new subspecies.

AMMONITELLA YATESI ALLYNI, **new subspecies.**

Shell in general like *A. yatesi yatesi* but flatter and the spire less deeply sunken. The last quarter turn of the body whorl is more swollen making the aperture slightly wider, especially in the lower third. The upper portion of the lip is slightly but definitely bent down, suggesting the lip of certain haplotremas. This last feature is not noticeable in the shells from Calaveras Co. The shells are somewhat lighter in color than the northern shells and possibly a bit thinner. In some cases, the spots on the living animal can be seen through the body whorl.

The type, no. 545, in the writers collection measures: greater diameter 7.3 mm., height 2.9 mm. 2 paratypes: greater diameter 8.0 mm., height 3.2 mm. and 3.0 mm.

Paratypes are being placed in the collections of the California Academy of Sciences, The Academy of Natural Sciences of Philadelphia (no. 187429), the Museum of Comparative Zoology and the private collections of Allyn G. Smith, Dr. W. O. Gregg, and Dr. S. S. Berry. More than 30 specimens were taken in dead maple leaves beside the trail from the parking area to the cave, Sept. 5, 1950.

The new subspecies is named for Mr. Allyn G. Smith, who, with Dr. W. O. Gregg, has helped with advice and the loan of specimens.

CATALOGUE OF ANCYLIDAE OF SOUTH AND CENTRAL AMERICA AND THE WEST INDIES, WITH DESCRIPTION OF A NEW SPECIES

By CHARLES B. WURTZ

In the course of a recent study (Wurtz, 1950), on certain West Indian mollusks, it became necessary to identify an ancylid from the island of Old Providence, Colombia. Since the consideration of that material (herein described as new), entailed an investigation into the known ancylid fauna of South and Central America and the West Indies, the publication of a catalogue of the known species from this area was thought desirable.

It has not been possible to study the majority of the species which are considered valid. Probably many specific names will, in time, fall into synonymy, while further collecting will uncover new species. Synonymical references used here reflect the opinions of previous workers who, presumably, had enough material to properly evaluate the species concerned. A catalogue of the known forms will appreciably abbreviate future studies.

The classification employed is that of earlier authors. The generic distinctions are not well defined, but the genera are recognized as distinct until enough data are accumulated for a sound synthesis of the classification.

The Ferrissiinae are the only Ancylidae known to occur in South or Central America or the West Indies. Walker proposed Ferrissiinae in 1917 [Naut., 31 (1): 2]. In this subfamily, the apex of the shell may be radially striate, punctate or smooth. Of the radula Walker (1924) says, "with a bicuspid central, the base being more or less wider below." However, Connolly (1938) says, "central tooth of radula usually with 4 cusps, of which 2 or 3 are very minute." Pilsbry (1924) presented a critical study of some ancylid radulae. His material was from preparations made by himself and by Dr. H. B. Baker. The drawings and descriptions of the teeth were the work of Dr. Baker. *Gundlachia, Hebetancylus, Uncancylus* and *Anisancylus,* discussed by Pilsbry in that study, had four

cusped central teeth. In an exhaustive study on the anatomy of *Ferrissia* (*F.*) *tarda* (Say), Hoff (1940) described the central tooth as bicuspid although Connolly (op. cit.) said *Ferrissia* had two mesocones and two minute ectocones.

When proposed, Ferrissiinae included *Ferrissia* Walker and *Gundlachia* Pfr. The first of these was divided into *Ferrissia* s.s. (by implication) and *Laevapex* Walker. The second was divided into *Gundlachia* s.s and *Kincaidilla* Hannibal (*Kincaidella* in Walker). Walker distinguished parallel groups in these two genera. *Ferrissia* s.s. and *Kincaidilla* with apex rapidly striate; *Laevapex* and *Gundlachia* s.s. with apex smooth. At the same time, he included *Burnupia* Walker, *Hebetancylus* Pilsbry, and *Uncancylus* Pilsbry in the subfamily. These have a smooth or punctate apex although Walker thought they had only the punctate apex.

Connolly (op. cit.) quotes an account by Hugh Watson which indicates that Walker was misled in his schematic arrangement. Walker himself anticipated this and considered his arangement largely tentative (Walker, 1924, p. 11). Watson, in Connolly, limits *Gundlachia* to those septum-forming species with the apex smooth and with a great difference in the size of the two main cusps of the central tooth of the radula. These species, so far as is known, are confined to Central and South American and the West Indies. Thus *Kincaidilla* is not to be included with *Gundlachia.*

Genus *Ferrissia Walker,* 1903. Naut., 17 (2): 15. Type *Ancylus rivularis* Say. Syn. *Haldemania* Clessin, 1880, non Tryon, 1862.

Subgenus *Ferrissia* s.s. Shell with acute apex which is radially striate. Central tooth of radula with two equal mesocones and two minute ectocones.

1. *Ferrissia adamsi* Wlkr., 1921. Naut., 34 (3): 74. Jamaica

2. *Ferrissia bayacalifornica* Wlkr., 1924. Journ. Wash. Acad. Sci., 14: 431. Lower California, Mexico.

3. *Ferrissia beaui* (Bgt.), 1853. Journ. de Conch., 4: 176. Puerto Rico; Guadeloupe.

4. *Ferrissia bermudensis* Van., 1910. Proc. Acad. Nat. Sci. Phila., 62: 670. Bermuda.

5. *Ferrissia blandi* Wlkr., 1921. Naut., 34 (3): 75. St. Vincent.

6. *Ferrissia jamaicensis* Wlkr., 1921. Naut., 34 (3): 73. Jamaica.

7. *Ferrissia occidentalis* Wlkr., 1924. Journ. Wash. Acad. Sci., 14: 431. Lower California, Mexico.

Subgenus *Laevapex* Walker, 1903. Naut., 17 (2): 15. Type *Ancylus fuscus* C. B. Adams. Shell with obtuse or subacute apex which is smooth. Radula as in *Ferrissia* s.s.

8. *Ferrissia aquadae* Goodrich and Van der Schalie, 1937. Univ. Mich. Mus. Zool. Misc. Publ., No. 34: 34. Guatemala.

9. *Ferrissia bahamensis* Clench, 1938. Mem. Soc. Cubana Hist Nat., 12 (4): 318. Grand Bahama Island, Bahamas.

10. *Ferrissia excentrica* (Morelet), 1851. Test. Nov. Ins. Cubanae et Amer. Cent., pars 11:17. Syn. *A. radiatus* Guilding, 1828, Zool. Journ., 3: 536. Texas; Mexico; Yucatan; Guatemala; Nicaragua; Costa Rica; Cuba; St. Vincent.

10 a. *Ferrissia excentrica biolleyi* (v. Martens), 1899. Biol. Cent.-Amer., 9: 402. Costa Rica.

10b. *Ferrissia excentrica pittieri* (v. Martens), 1899. Biol. Cent.-Amer., 9: 402. Costa Rica.

11. *Ferrissia haitiana* Clench and Aguayo, 1937. Mem. Soc. Cubana Hist. Nat., 11 (2): 70. Haiti.

12. *Ferrissia joseana* Morrison, 1946. Smith. Misc. Coll., 106 (6): 39. San José Island, Gulf of Panama.

There are several references to *Ferrissia obscura* (Haldeman), 1844, Mono., p. 9, in the West Indian literature. This species has been listed from various West Indian islands as a result of incorrect determinations. Walker (1920) discusses the history of the name and the known West Indian specimens referred to it. *F. obscura* is apparently restricted to the headwaters of the Tennessee River system in North America.

Genus *Gundlachia* Pfeiffer, 1849. Zeitschr. f. Mal., 6: 98. Type *Gundlachia ancyliformis* Pfr. Shell with smooth apex. Central tooth of radula with two assymetrical mesocones (the left one being far larger than the right) and two ectocones.

The genus was founded to include those ancylids which formed a septum across the posterior end of the aperture. As has been recognized since that time, those species which are included in

Gundlachia may or may not form a septum, and this faculty is probably a response to environmental factors. For a chronologic discussion of this phenomenon, reference should be made to Hedley (1895), Dall (1904), Walker (1907), Dall (1911), Pilsbry (1913), Connolly (1938), and Aguayo (1946). Pilsbry (1913) was of the opinion that the ability to form such a septum is of taxonomic value.

13. *Gundlachia ancyliformis* Pfr., 1849. Zeitschr. f. Mal., 6: 98. Syn. *G. adelosia* Bgt., 1862, Les Spiciliges Malacologiques, Paris, p. 83; *G. poeyi* Bgt., 1862, Spicil. Mal., p. 82; *Poeyia gundlachioides* Bgt., 1862, Spicil. Mal., p. 87. Cuba.

14. *Gundlachia bakeri* Pils., 1913. Proc. Acad. Nat. Sci. Phila., 65: 670. Brazil.

15. *Gundlachia crepidulina* Guppy, 1872. Proc. Sci. Assoc. Trinidad, p. 2. Trinidad.

16. *Gundlachia hinkleyi* Wlkr., 1917. Naut., 31 (1): 51. Guatemala.

17. *Gundlachia hjalmarsoni* Pfr., 1858. Malak. Blätt., 5: 197. Texas; Guatemala; Honduras.

18. *Gundlachia lutzi* Wlkr., 1925. Occ. Pap. Mus. Zool. Univ. Mich., No. 157: 5. Brazil. (The most southern species of the genus according to Walker.)

19. *Gundlachia nordenskioldi* Pils., 1924. Proc. Acad. Nat. Sci. Phila., 76: 57. Bolivia.

20. *Gundlachia textilis* Guppy, 1870. Amer. Journ. Conch., 6: 311. Trinidad.

Genus *Hebetancylus* Pilsbry, 1913. Proc. Acad. Nat. Sci. Phila., 65: 671. Type *Ancylus moricandi* Orb. Shell with a smooth or punctate apex which is obtuse. Central tooth of radula as in *Gundlachia* or symmetrical, but basal plate much broader posteriorly. The radula twice as wide as that of *Gundlachia*.

Pilsbry (1924), in discussing the radula of *Hebetancylus*, did not consider it a generic character. The genus was separated from *Gundlachia* by the absence of any septate form. A septate form of *Hebetancylus* is still not known. Aguayo (1946) was most doubtful of the propriety of separating *Hebetancylus* from *Gundlachia* (as was Connolly, 1938) and apparently found transitional shell stages between young (non-sept-

ate) *Gundlachia ancyliformis* and *Hebetancylus havanensis.* However his material was not conclusive and he recognized the genus while anticipating further investigation.

21. *Hebetancylus moricandi* (Orb.), 1837, Voy. dans l'Amér. mérid., Paris, 5: 355. (1837 was the date of pp. 185–376.) Syn. *Ancylus bahiensis* Moricand, *nomen nudum* (MSS); *Ancylus navicula* Spix, *nomen nudum* (MSS). Venezuela; Brazil.

22. *Hebetancylus adelinus* (Bgt.), 1862. Spicil. Mal., p. 227. Cuba.

23. *Hebetancylus cubensis* Pils. and Aguayo, 1933. Naut., 46 (4): 116. Cuba.

24. *Hebetancylus culicoides* (Orb.), 1835. Mag. de Zool., 5: 23. Colombia; Ecuador; Brazil; Paraguay.

25. *Hebetancylus havanensis* (Pfr.), 1839. Arch. f. Naturg., 5 (1). 350. Syn. *Ancylus pallidus* Poey, 1856. Mem. sobre la Hist. Nat. de la Isle de Cuba, 2: 32. Cuba; Santo Domingo;? Georgetown (Aguayo).

26. *Hebetancylus lemoinei* (Ancey), 1901. Le Nat., 23: 103. Brazil.

27. *Hebetancylus plaerius* (Bgt.), 1862. Spicil, Mal., p. 214. Brazil

28. HEBETANCYLUS PROVIDENTIALIS, **new species**. Pl. 4, figs. 8 and 8a.

Shell elliptical, width contained from 1.3 to 1.5 times in the length, twice as wide as high. Both anterior and posterior ends broadly rounded. Left edge more strongly curved than right edge. Minute apical depression at the apex. Apex $\frac{1}{6}$ to $\frac{1}{5}$ the length from the posterior margin and $\frac{1}{4}$ the width from the right margin; slightly bent downward. Apical sculpture closely punctate, arranged radially (as in *Burnupia,* though not as pronounced as in that genus). Later sculpture of distinct, equidistant, radiating riblets which reach to the perimeter of the aperture; the riblets are more pronounced on the posterior slopes and the upper part of the anterior slopes. Concentric sculpture of irregularly spaced and variably pronounced growth lines. Anterior slope convex, with height of the convexity, which is the top of the shell, anterior to the apex proper. Posterior slope straight, becoming concave at the perimeter of the aperture. Left slope straight. Right slope concave. Radula with 14–1–14 teeth in a width of 100 micra. Transverse rows straight; outer three longitudinal rows well separated. The

central tooth is symmetrical and consists of two mesocones and two ectocones. (Radular observations made with mounts in glycerine jelly, glycerine alone, and water. These were studied under a 90× apochromatic lens with 6×, 10× and 16× oculars. The cusps are so minute that they could not be resolved to complete satisfaction, but the remarks made are based on protracted observations.)

The type and ten paratypes (ANSP 186643) vary in length from 1.7 to 2.3 mm. and in width from 1.2 to 1.7 mm. The holotype is 2.0 mm. × 1.4 mm. × 0.7 mm. (Pl. 4, figs. 8 (Type) and 8a (Paratype).)

The apical sculpture of this species resembles that of the African genus *Burnupia* while the symmetrical central tooth of the radula is like *Burnupia* or *Ferrissia* rather than *Hebetancylus*. The contours of the shell and the punctate apex (even though the latter is radial) incline me to place this species in *Hebetancylus*. The species is peculiar.

Dr. Pilsbry collected two, much worn specimens in beach debris on Old Providence which probably belong to this species. They measure 3.5 mm. × 2.5 mm. × 1.2 mm. and 3.1 mm. × 2.3 mm., respectively. (The second is lacking the apex.) These are larger shells than I collected and differ further by having the apex of the unbroken shell on the median line at ⅙ the distance from the posterior end. I hesitate to place these specimens in *H. providentialis* but think unlikely that two peculiar species occur on one small island.

The material was collected in Huffington's Creek on the island of Old Providence, Colombia. This island is about four miles long by two wide and lies about 125 miles off the coast of Nicaragua. It is of volcanic origin and reaches an elevation of 1190 feet. The material was collected 30 April, 1948, while I was a member of the Catherwood-Chaplain West Indies Expedition. I am indebted to the Academy of Natural Sciences for allowing me to publish this species in conjunction with the catalogue.

The species is named for the island.

Genus *Uncancylus* Pilsbry, 1913. Proc. Acad. Nat. Sci. Phila., 65: 671. Type *Ancylus barilensis* Moricand. Differs from the preceding genus by having an acute hooked apex. The

asymmetry of the central tooth is not marked and resembles *Ferrissia* in this respect.

29. *Uncancylus barilensis* (Moricand), 1845. Mem. Soc. d' Hist. Nat. Geneve, 11: 159. Brazil. ("South America as far north as Costa Rica." Pilsbry.)

30. *Uncancylus ameliae* Pils., 1920. Proc. Acad. Nat. Sci. Phila., 72: 9. Costa Rica.

31. *Uncancylus calverti* Pils., 1920. Proc. Acad. Nat. Sci. Phila., 72: 7. Costa Rica.

32. *Uncancylus chittyi* (C. B. Adams), 1851. Contr. Conch., 10: 204. Syn. *Ancylus obliquus* C. B. Adams, 1850. Ann Lyc. Nat. Hist. N. Y., 5: 48 *non* Broderip and Sowerby; *Ancylus petitanus* Bgt., 1853. Journ. de Conch., 4: 172. Jamaica; Guadeloupe.

33. *Uncancylus concentricus* (Orb.), 1835. Mag. de Zool., 5: 24. Puerto Rico; Uruguay; Patagonia.

33a. *Uncancylus concentricus bonairensis* (Strobel), 1874. Mater. per una Malacostatica de Terra e di Acqua Dolce dell' Argentinia Meridionale, Pisa, p. 51. Argentina; Patagonia.

34. *Uncancylus rushii* (Pils.), 1897. Proc. Acad. Nat. Sci. Phila., 49: 298. Uruguay.

An unidentified species of *Uncancylus* was recorded from southern Vera Cruz, Mexico by Baker (1923).

Genus *Anisancylus* Pilsbry, 1924. Proc. Acad. Nat. Sci. Phila., 76: 58. Type *Ancylus obliquus* Broderip and Sowerby. Shell with a smooth, obtuse apex, inclined toward the right. The asymmetry of the central tooth, like *Gundlachia* and *Hebetancylus,* is pronounced.

35. *Anisancylus obliquus* (Brod. and Sow.), 1832. Proc. Zool. Soc. London, Pt. 2, p. 202. Syn. *Ancylus gayanus* Orb., 1837, Voy. dans l'Amer. merid., Paris, 5: 356; *Ancylus radiatus* Orb., 1835. Mag. de Zool., 5: 25 *non* Guilding, 1828. Peru; Chile; Uruguay.

35a. *Anisancylus obliquus gayanus* (Orb.) Syn. *Ancylus gayanus obliquus* (Sow.) in Biese, 1949. Bol. Mus. Nac. Hist. Nat., 24: 229. Chile.

35b. *Anisancylus obliquus maximus* (Biese), 1949. Bol. Mus.

Nac. Hist. Nat., 24: 230. Syn. *Ancylus gayanus maximus* Biese, 1949. Chile.

35c. *Anisancylus obliquus rudolfii* (Biese), 1949. Bol. Mus. Nac. Hist. Nat., 24: 232. Syn. *Ancylus gayanus rudolfii* Biese, 1949; *Ancylus paulsonii* "Phil." Biese, *nomen nudum* (being an MS. name of Philippi on a label in the collection of the Museo Nacional de Santiago). Chile.

Unclassified species

36. *Ancylus aorus* Bgt., 1862. Spicil. Mal., p. 216. Brazil.

37. *Ancylus charpenterianus* Bgt., 1853. Journ. de Conch., 4: 173. Chile. Walker (1923) suggests that this species is an *Uncancylus*.

38. *Ancylus complanatus* Bgt., 1862. Spicil. Mal., p. 231. Cuba.

39. *Ancylus crequii* Bavay, 1904. Bull. de la Soc. zool. France, 29: 156. Lake Titicaca.

40. *Ancylus fonki* Phil., 1866. Mal. Blätt., 13: 38. Chile.

41. *Ancylus haldemanii* Bgt., 1853. Journ. de Conch., 4: 180. Syn. *A. depressus* Hald., 1844, Mono., p. 6, *non* Deshayes 1824. Mexico.

42. *Ancylus irroratus* Guilding, 1828. The Zool. Journ., 3: 535. Cuba; St. Vincent; Trinidad.

43. *Ancylus leucaspis* Ancey, 1901. Le Nat., 23: 103. Brazil.

44. *Ancylus papillaris* v. Martens, 1899. Biol. Cent.-Amer., 9: 402. Mexico.

45. *Ancylus paranensis* "Döring" Clessin, 1882. Küst. Syst. Conch.-Cab. Mart. and Chemn., Nürnberg, 1 (6): 69. Argentina.

46. *Ancylus parasitans* Drouet, 1859. Mem. Soc. Acad. d' Agric., etc., de l'Aube, (2) 10: 387. Martinque.

47. *Ancylus patagonicus* Biese, 1949. Bol. Mus. Nac. Hist Nat., 24: 235. Chile.

48. *Ancylus pfeifferi* Bgt., 1862. Spicil. Mal., p. 229. Syn. *A. radiatilis* Pfr., 1852, Zeitschr. f. Mal., p. 183 *non* Morelet, 1851. Cuba.

49. *Ancylus philippianus* Biese, 1949. Bol. Mus. Nac. Hist. Nat., 24: 234. Syn. *A. valdivianus* "Phil." Biese, *nomen nudum* (being an MS. name of Philippi on a label in the collection of the Museo Nacional de Santiago). Chile.

50. *Ancylus plagioxus* Bgt., 1862. Spicil. Mal., p. 217. Brazil.

51. *Ancylus radiatilis Morelet,* 1851. Test. Nov. Ins. Cubanae et Amer. Cent., Paris, pars 11: 17. Isle of Pines; Cuba; Haiti.

52. *Ancylus sallei* Bgt., 1857. Rev. et Mag. Zool., 9 (2): 16. Mexico; Cuba.

53. *Ancylus saulcyanus* Bgt., 1853. Proc. Zool. Soc. London, Pt. 21, p. 92. Venezuela.

54. *Ancylus uncinatus* Ancey, 1897. Bull. Mus. Zool. Comp. Torino, 12: 21. Argentina.

55. *Velletia fuhrmanni* Piaget, 1914. Mem. Soc. Sci. Nat. de Neuchatel, 5: 267. Colombia.

Ancylus (*Acroloxus*) *compressus* Dkr. and *Ancylus* (*Acroloxus*) *striatulus* Dkr. are *nomina nuda.* They were names used by Dunker in a letter to Gundlach and subsequently published by Arango (Contr. a la Fauna Malac. Cuba, Habana, 1878, pp. 137–138). They were both presumed to be Cuban species.

I am much indebted to Dr. H. A. Pilsbry for his generous help in innumerable ways during the preparation of this catalogue.

Bibliography

Aguayo, C. G. 1946. Rev. Soc. Mal. "Carlos de la Torre," 4 (2): 55–62.

Baker, H. B. 1923. Occ. Pap. Mus. Zool. Univ. Mich., No. 135: 3.

Connolly, M. 1938. Ann. S. African Mus., 33: 1–660.

Dall, W. H. 1904. Naut., 17 (9): 97–98.

——. 1911. Amer. Nat., 45: 175–189.

Hedley, C. 1895. Naut., 9 (6): 61–68.

Hoff, C. C. 1940. Trans. Amer. Micr. Soc., 59 (2): 224–242.

Pilsbry, H. A. 1913. Proc. Acad. Nat. Sci. Phila., 65: 668–671.

——. 1924. Proc. Acad. Nat. Sci. Phila., 76: 54–59.

Walker, B. 1907. Naut., 21 (2): 14–17.

——. 1920. Naut., 33 (3): 99–103.

——. 1923. Naut., 37 (1): 7–16.

——. 1924. The Ancylidae of South Africa. Printed in Great Britain for the author. Though the cover is dated 1923 it was not published until early in 1924.

Wurtz, C. B. 1950. Proc. Acad. Nat. Sci. Phila., 102: 95–110.

EUROPEAN BALLAST SHELLS IN STATEN ISLAND, N. Y.

By MATHILDE P. WEINGARTNER

Since early 1944 extensive work has been going on at what used to be called Oakwood Beach, and is now called Great Kills Park, Staten Island, New York. The Department of Parks of the City of New York filled in large sections of swamp in order to construct a park and new bathing beach. In 1944, one of the materials used as fill was sand that had been brought from England and the Mediterranean in the holds of Liberty ships as ballast during the recent war. This sand was loaded into lighters and barges, hauled to Oakwood Beech and dumped on dry land to fill in behind a bulkhead. At no time did it come in contact with the waters of New York Bay.

In this sand was much shell material, none of it very good, yet good enough to be identified. The following species were collected and are in the possession of the writer as well as in a duplicate collection at the Staten Island Museum:

Dentalium dentalis L.
Dentalium vulgare Desh.
Pecten maximus L.
Glycymeris glycymeris L.
Ostrea edulis L.
Cardium edule L.
Cardium ciliare L.
Solen vagina L.
Donax anatina Lam.
Tellina nitida Poli
Tapes decussatus L.
Chione gallina L.
Mactra inflata Phil.
Murex brandaris L.
Thais lapillus L.
Natica josephinae Risso
Buccinum undatum L.
Potamides mamillatus Risso
Littorina obtussata L.
Acteon fasciata Lam.
Nassa gibbosula L.
Cyclonassa neritea L.
Nassa reticulata Lam.

All this material was later covered up with garbage and later still, with a layer of ordinary sand. I mention this so that if ever a hurricane or other forces should expose any of these shells, their origin may be known.

This paper was read at the February 4th meeting of the New York Shell Club, at whose suggestion I am submitting this paper.

NOTES ON SOME STREPTAXIDS

By F. HAAS

Fultonelma, **n. subg.** of *Elma,* type *E.* (*F.*) *inconspicua* (Morelet).

What are *Bulimus exiguus* and *B. inconspicuus,* both described by Morelet?

A. Morelet described in 1881 (Journ. Conch. Paris, 29) two species of *Bulimus* from the island Mayotte, Comoro Islands, to which he gave the names *B. inconspicuus* (p. 218, pl. 9, fig. 4) and *B. exiguus* (p. 218, pl. 9, fig. 6). These species seem to have been overlooked by following monographers, for Kobelt and Moellendorff do not list or mention them either in their catalogue (1903) or in their monograph (1899–1902) of the Buliminidae (= Enidae). This omission, however, is not on account of a better understanding of the two species in question, that is, to the discovery that they are not *Bulimus* at all, but belong rather to the family Streptaxidae; for had this been the case, they would have included them in their monograph of the Agnatha, pt. 1 (1902–1905). The credit for having recognized the true affinities of both *"Bulimus" exiguus* and *inconspicuus,* belongs to the late Hugh C. Fulton who sent specimens of both species, with the correct assignation to the streptaxid genus *Elma,* to Walter F. Webb, from whom they came, together with Mr. Webb's entire private collection of nonmarine shells, to the Chicago Natural History Museum; moreover, in his copy of vol. 29 of the Journal de Conchyliologie, on p. 219, Fulton changed Morelet's generic name *Bulimus* to *Ennea* (*Elma*); by a strange coincidence, Fulton's personal set of the Journal de Conchyliologie has come to rest in the library of the Chicago Natural History Museum, where Fulton's manuscript entry can be seen.

The reason why such an expert conchologist as A. Morelet arranged his two new species *exiguus* and *inconspicuus* with *Bulimus* rather than with the streptaxids, is because the two species mentioned, apparently alone among all the streptaxids, do not show the glossy, silky ivory surface that all their relatives exhibit. They are covered, instead, with a more or less striate

yellowish brown conchinic layer, such as most of the Enidae show; the remaining shell characters however, especially the receding upper edge of the peristome, are unmistakeably streptaxid in nature.

In my opinion, the distinguishing character of *exiguus* and *inconspicuus,* places them apart from the remaining species of *Elma* and entitles them to a subgeneric unit of their own, for which, for reasons now understandable, I propose the name of *Fultonelma* n. subgen. with *Bulimus inconspicuus Morelet* as type species.

Since there exists an earlier *Bulimus exiguus* Reeve, 1850, *B. exiguus* Morelet, 1881, cannot retain its name: hence, I propose for it the new name *Elma bisexigua.* The synonymy reads as follows:

Elma (Fultonelma) bisexigua, **n. nom.**

Bulimus exiguus Morelet, Journ. Conch. Paris, 29, p. 218, pl. 9, fig. 6, 1881; nec Reeve, Conch. Icon, 5, pl. 88, fig. 654, 1850.

Thaumatogulella, **subgen. n.** for *Gulella prodigiosa* (E. A. Smith).

Ennea prodigiosa, described by E. A. Smith (Journ. Conch. London, 10, p. 316, pl. 4, fig. 11; 1902), is a *Gulella* in the generally accepted concept of the genus, but it cannot be properly placed in any of the known subgenera of *Gulella.* The solute last whorl and the characteristic peristomal sinulus, which is circular and almost closed, assign a special place to it. The new subgenus *Thaumatogulella* is therefore here proposed with *G. prodigiosa* as type and only species.

ARNOLD EDWARD ORTMANN AS REVEALED BY HIS LETTERS

By HENRY VAN DER SCHALIE

There have been at least two informative biographical articles dealing with A. E. Ortmann (Pilsbry, *Nautilus,* 1927, 40: 109–111; and Holland, *Science,* January 14, 1927, 65: 29). The factual information contained in those publications need not be repeated here. The purpose of this account is to give a personal

narrative of this unusually capable scholar from statements appearing in his letters to friends and colleagues. Through this correspondence, we get some insight into several aspects of the work in which he was engaged, as well as of his thoroughly scientific attitude toward research. These letters are of special value largely because he seldom published anything for which he did not have considerable evidence. Even his published papers appear often to be ignored and there are indications that his zoögeographical publications are worthy of more attention than they have received. Some of his basic contributions never found their way into print. He shared his broad interests with his colleagues in a most unselfish way and much valuable information is contained in his letters to E. B. Williamson, Bryant Walker, Calvin Goodrich, and others.

In order to dispel any doubt as to the propriety of delving into Ortmann's correspondence for the purpose of obtaining a better concept of the man and his work, I would like to begin with a quotation from one of his letters to Calvin Goodrich (December 15, 1910) in which he said:

"Do no feel alarmed about having used any information received from me in any way you see fit. I am not jealous, and anybody is welcome to use and to *criticise* whatever I may say in private correspondence. I also do not object if anybody *publishes* anything for I am not working for my personal benefit but for the good of science, and I know myself best that I cannot work out everything myself. I wish I could induce many more conchologists to work along the same lines I am working."

During his early years (1903–1907) in the Carnegie Museum, Ortmann worked with crayfish. He carried on a lively and highly interesting correspondence with the late E. B. Williamson, who at that time was also interested in the decapods. These men shared a strong feeling of bond since Williamson had formerly been employed in the Carnegie Museum and understood something about the policies and purposes of that institution. Although a number of very interesting aspects of Ortmann's work relating to his studies of Crustacea would interest malacologists any attempt to cover his contributions to that field would be too time-consuming. As will suffice here to mention, Ortmann's research with Crustacea was outstanding. He named a number of new species, was a careful student of their

habits and life history, and made especially noteworthy additions to our knowledge of the zoogeography of those animals. In the field of systematics, he was the first to recognize the importance of genital structures in arranging a natural classification of the decapods.

An aspect of Ortmann especially revealed in his letters is his unusually constructive and wholesome attitude toward his colleagues, as typically shown in the following quotations:

(1). He was asked to review a manuscript by E. B. Williamson and in returning it he wrote (Feb. 4, 1906):

"I have not used any notes from your M.S. Go ahead with your work and collect the *facts;* when my memoir is out, you will see how they can be used to advantage; but what we need first is the facts of distribution, of life history, etc. Pay particular attention to the limits of distribution."

And, again, May 4, 1906:

"I want you to understand that I do not intend to put a mortgage on your collections for my benefit. On the contrary, I want to have the whole credit to you, and wish *you* to work it up. If I can offer you any assistance I am ready to furnish it to you. I hope my memoir will come out some time during this summer, and then you will get suggestions from it: in the meantime collect dates. They will help you to make up your conclusions as to life history. Some time I shall send you notes on the material received to show you how I would do the work."

(2). Ortmann's relations with Walker were equally generous and constructive. The following three quotations clearly indicate the splendid co-operation that existed between these men. Ortmann shifted his main interest from crayfish to mussels in 1907. Comparatively early in his correspondence with Walker, he wrote (April 2, 1908):

"My special work is in *Unio,* but, of course, if I come across any other thing in the line of Mollusks, I take it along. But this explains that I have not done as much work in other groups as might possibly be expected considering the fact that I spend a good deal of time collecting. But I have the best intentions and shall do what I can, and if I can be of service to you in any way, please let me know, and I shall keep it in my mind and remember it in the field when I have a chance."

In the course of their later work the following statement, taken from two letters from Ortmann to Walker, show the generous way Ortmann and Walker worked together: (July 22, 1911):

"Your letter of July 4 has been received, also a picture postal card. As to the new genus and species, discovered by Mr. Wheeler, I do not feel a desire to describe it, and should like to leave this entirely to you. Of course the species should be (*Arkansia*) "wheeleri" for Mr. Wheeler is entitled to this recognition."

Again, in a letter about (*Quincuncina*) *U. burkei,* dated June 23, 1915:

"I understand that you are going to describe this new species, and in this case, you probably would like to have the notes about the anatomy. I shall be glad to furnish these to you together with the conclusions as to the systematic position. Please let me know whether and when you want them."

Ortmann was by nature very systematic. This trait is clearly evident in the way he started his studies of the mussels first in his own state and then gradually extending his endeavors into a wider field. In a letter to Walker, Aug. 18, 1911, he stated:

"You see, I am trying my best to do the work, systematically, taking up river by river, finding out what *is* in the rivers, but also what *is not.* The latter fact is sometimes even more interesting."

He carefully enlarged his realm with due regard for direction, and he built on the information as he went. This process is shown in his work both with crayfish and later with the mussels —a group with which he was able to carry his ventures considerably farther.

The studies which Ortmann and Walker carried on together were unusually extensive. Although these men were not by any means in full agreement in all matters, there was, never the less, an excellent spirit throughout the controversial phases of their work. The following quotations indicate the constructive way in which they weathered their disagreements.

(1). Following a long and detailed discussion concerning the identity of a species, Ortmann concluded (Dec. 8, 1913):

"For the present I would call your specimen *maculatum*. Whether the *figured type* of *appressum* is this, is doubted. But it is sure that some specimens of Lea's *appressum* (at least one) is this, but not the *type*. But also this should be re-examined. You and Frierson have, by your presistent kicking about my conception of *appressum*, shaken my faith in my own previous examination of the supposed type."

(2). In a letter to Calvin Goodrich, No. 4, 1913, Ortmann wrote:

"I am fighting with Walker and Frierson over my Tennessee material: the great trouble is that they have identified species from specimens distributed among collectors under the *wrong name*, hence the confusion. Of course, a good deal of the confusion goes back to Lea, and Simpson, handicapped as he was,* also increased the confusion. It is simply awful. There is another difficulty: I cannot send *all* of the material to Walker for inspection and so he does not see several points on which I insist. But I hope we shall straighten that out finally."

(3). An indication, as to how carefully and critically Walker and Ortmann checked on one another, is found in a letter dated Dec. 20, 1918:

"I am sorry I again wrote Fusconaja: but the M.S. of this article was written about a year ago, before you called my attention to this slip. I won't do it again, if I can help it. Can't you treat it simply as a misprint, slip of the pen, or slip of something else?"

In studying mussels, Ortmann always stressed the significance of anatomical evidence. His knowledge was thorough and basic. He had a far better comprehension of relationships than most of his colleagues. But he was careful to respect the work of others and he had a keen appreciation of their contributions. I was especially interested in the following statements taken from a letter to Walker (Aug. 7, 1914), which clearly gives Ortmann's evaluation of Simpson's *Catalogue:*

"First of all, my best thanks for the copy of Simpson's Descriptive Catalogue. Of course, there is much to be said about it, and the general arrangement is not up to date. However, I realize that it is, at present, simply impossible to pay attention,

* (That is to say, handicapped by having Lea's material in such a confused state.)

in a work like this, to the changes in the system which must be introduced in consequence of anatomical investigation. I do not blame Simpson for this, and shall not criticize him."

"What is really valuable, and what has been pointed out in the introduction as the chief purpose of the work, is the *furnishing of adequate descriptions of all species.* This has been done now, and this will make the work of *everlasting* importance, no matter what the future changes will be in the general system. This work now supercedes the Synopsis, and I, for my part, shall have it always at my elbow for reference and study! Also your share in the publication must be highly appreciated."

As is generally known, a great deal of confusion existed in the naiad nomenclature as it concerned certain names proposed by Rafinesque. As early as Dec. 31, 1912, Ortmann wrote to Walker indicating that Rafinesque himself felt that his generic names were well supported, and Ortmann raised the question as to what the International Commission would rule on those names. A voluminous correspondence is at hand dealing with this problem and only sufficient data can be given here to indicate that the work of Ortmann and Walker in dealing with this problem was as fair to all parties concerned as they could possibly make it. In a letter dated Feb. 10, 1913, Ortmann wrote:

"However, I want to bring out the other side of the argument, that is to say I am acting as "*advocatus diaboli*" when I say that, according to *formal rules,* that is to say the *actual wording* of the rules, it is possible to entertain the opposite view. Which is to say, that I consider the rules insufficient and misleading."

From this statement, there was clearly much by way of interpretation needed to clear away many of the specific cases. L. S. Frierson was especially anxious to champion Rafinesque's cause and both Ortmann and Walker did what they could to take Frierson's contentions into account. In a letter to Walker, dated April 19, 1920, Ortmann wrote:

"Frierson seems to be offended that we do not accept *all* of his "dicta" as gospel truth. He entirely forgets that we have accepted quite a few of his suggestions, published and unpublished, and he apparently does not see that our way of treating the subject is the only candid and scientific one. I want to be fair to all parties concerned, not only to Rafinesque, and we have no bias against anybody, none against Lea, and none against Frierson."

A few days later (April 25, 1919) Ortmann wrote to Goodrich:

"I hope Walker and I will come to an understanding concerning Rafinesque's names. I freely admit that I have gone much too far, influenced by Frierson. About one third of the disputed cases are settled, and Walker is now studying the rest (or is going to when he returns from Alabama). Walker surely has had more (common sense) in this respect: but I have reformed and practice now much self-criticism."

The work of these men and the work of Pilsbry, who acted as judge in the disputed cases, will stand as a monument to their keen judgment and scientific acumen. As is, however, surprising, some of the authorities today are disregarding the conclusions so carefully arrived at by this unusual combination of excellent authorities.

Zoögeography is a field in which Ortmann was especially interested. His long list of contributions to this subject ought to be quite generally known. His letters are full of information supplementing the data appearing in his papers. For our purposes, only a few examples can be given of how his mind continually probed the zoogeographical implications of the data he accumulated. In a letter to Walker, dated Oct. 23, 1912, he wrote:

"What you say about the general origin and distribution of our Najades is, as I believe, essentially correct, and I have about the same general idea of it. Add to it only the following idea: When the Najades, coming from the S. W., reached the Ozark-Cumberland Plateau region and the Tennessee drainage, there was no lower Mississippi River. The Tennessee-Cumberland drainage formed the headwaters of a big *northward* flowing River, which carried the waters of the 'interior basin' into the Arctic Ocean. There was no Ohio at that time either. Ohio and Lower Mississippi were formed in consequences of the ice advancing from the North in the Glacial Age. All the tributaries of the Ohio in W. Va. and Pa. did *not* belong to that big Interior-basin River, but belonged to the basin of the old, Preglacial, Erigan River, which flowed approximately in the direction of the present St. Lawrence. The present Ohio River fauna of Naiades (at least the bulk of it) is a *post-glacial* expansion of the inner Basin-fauna *up* the newly formed Ohio. Hence the contrast of the fauna in the headwaters."

"The question arises, what was the fauna of the preglacial Erigan River and its tributaries (old Kanawha, old Monongahela, and the parts of the old Allegheny)? I think we may safely assume that those species found in the headwaters of

these streams, *above the falls line,* may furnish us a clue. I think *Strophitus edentulus* is one of them. But this, of course, is a very ticklish question. If I could get fossil shells from our high-river-terraces (late Tertiary and early Glacial), these would furnish positive evidence. But I have only a few unrecognizable casts from the foundations of the Base-Ball Grand Stand near our Museum, and I have not yet made a serious attempt to identify them. I must postpone this for the future, and am hoping all the time to get better material."

(*To be continued*)

HELICELLA CAPERATA (MONTAGU) IN YORKTOWN, VIRGINIA

By JOHN THORNTON WOOD

Virginia Fisheries Laboratory, Gloucester Point

According to Dr. H. A. Rehder (letter, May 24, 1950), *Helicella caperata* [1] (Montagu) is indigenous to England and much of Europe, but no colony has heretofore been found in the United States. At Yorktown, the species is well established, occupying an exposed grassy habitat between Water Street and the York River beach. The wooded slopes bordering on Water Street contain large numbers of *Triodopsis tridentata juxtidens* (Pilsbry), and numerous other species including *Triodopsis albolabris* (Say), *Mesodon thyroidus* (Say), *Ventridens suppressus* (Say), *Retinella indentata* (Say), and *Gastrocopta contracta* (Say). *Helicella caperata* has not succeeded in establishing itself on the slope, but in a few localities a few of its dead shells may be collected.

These snails are most conspicuous after heavy rains during the summer months, when thousands of them are "flooded out" of their burrowings and places of concealment among the grass rootlets. The snails then cover the sidewalks, and climb in numbers up the grass, especially congregating on stray bread wrappers and paper cups where they pause and feed. The larger snails range in diameter between 8 and 9 mm. The three snails illustrated in the 3 upper figures of plate 10 measured approximately 8 mm. in diameter.

[1] *Jacosta* (*Candidula*) *caperata* (Montagu) = (?) *J. intersecta* (Poiret) —H. B. B.

Yorktown has been long abandoned as a port of entry for shipments from Europe. While impossible to define the period in which this snail was introduced in other than very general terms, I obtained the following statement in the period in which Yorktown was serving as a port, from Park Historian C. E. Hatch, Jr., of the Colonial National Historical Park—"Limited shipping in the Yorktown area of the York River very likely began about 1635. There was heavy shipping to and from Europe after the establishment of the "Town of York" in 1691. It was particularly heavy in the period 1700–1770. After 1800 Yorktown ceased to function as in important commercial center."

I wish to acknowledge my indebtedness to Dr. H. A. Rehder of the U. S. National Museum for identification of my specimens, and information about them.

NOTES AND NEWS

JACOSTA (CANDIDULA) INTERSECTA (Poiret) in United States —In making a small collection of land snails near Beaufort, Carteret County, North Carolina during August, 1950, I found two colonies of *Jacosta* (*Candidula*) *intersecta* (Poiret) = *Helicella caperata* (Montagu), which seems not to have been previously reported living in North America.

The first of these colonies was found on Piver's Island, a small island separated from the mainland by a channel. In the area bounded by the U. S. Bureau of Fisheries, Duke Marine Laboratory, the only road on the island, and Beaufort Channel are scattered plants of *Yucca aloifolia* Linnaeus. Many of them have apparently been blown over and have taken root again. Beneath these fallen plants, the snails were found. The second colony was found along U. S. Highway 70 between the Newport River and the Beaufort Channel. These snails were beneath various flat articles (pasteboard, lumber, roofing, etc.) scattered along both sides of the highway. In each case, both immature and mature snails were found, indicating perhaps that the colonies have been established for some time.

Specimens were placed in the Museum of Comparative Zoölogy at Harvard and in the Museum of Natural History at

the University of Kansas (KUMNH 6382, 6383). I wish to express my thanks to Dr. W. J. Clench for checking the identification and to Dr. A. B. Leonard and Glenn R. Webb for their suggestions.—D. SAUNDERS, University of Kansas, Lawrence.

STROMBUS BITUBERCULATUS LAMARCK.—I have finally been able to get at the series of the dwarf *Strombus bituberculatus,* taken at the southern end of Lake Worth, and have found some very interesting features. I took a series of 198 specimens, of which 116 were females and 82 males, a proportion of 3 males to 2 females. The lengths of the 82 males measured are as follows: mean length 48.2 mm., extremes 38 mm. to 65 mm. The lengths of the 116 females give: mean length 57.5 mm., extremes 51 mm. to 67 mm.

To get a true perspective of the size of this dwarf race, all the shells of normal *S. bituberculatus* I have on hand were measured, and the results, based on 93 shells, sex not determined, are as follows: mean length 79 mm., extremes 57 mm. to 97 mm. In 81 (87.5 per cent) of these shells, the lips exceeded the spire in length; in 12 (12.5 per cent), the lips were shorter than or equal to the spire.

Thus this dwarf race seems to differ from normal *S. bituberculatus* in the following: 1st, it is decidedly smaller; 2nd, it is much darker in color; 3rd, and most important, 100 per cent of the dwarf race have the lip of the shell shorter than the spire. The difference in the form of the shell is very striking when examining a series. In normal *S. bituberculatus,* about 12.5 per cent of the shells have the lips shorter than the spire or of equal length (about equally divided). In the light of the foregoing, I am inclined to believe that this dwarf race possibly is entitled to subspecific rank.—B. R. BALES, (from a 1937 letter).

COPULATION OF BULIMULUS ALTERNATUS MARIAE AND B. SCHIEDANUS.—The successful copulation between these two bulimulids was noted of captive specimens June 28, 1949 when they were noted just as coitus was being disrupted. The spermatophore from the specimen of *B. a. mariae* was found implanted in the female organ of the specimen of *B. schiedanus.* The spermatophore was artificially removed from the recipient for study, and was recovered entire except for a small part of the tip. No data were obtained as to the status of the coitus in regard to

reciprocity. Clearly genitalia amixia does not exist between *B. a. mariae* and *B. schiedanus* since *B. a. mariae* had effectively inseminated the other species. The facts of inter-species fertilization have yet to be determined, since hybridization does not necessarily ensue from a cross-insemination.—Glenn R. Webb, Ohio, Ill.

The American Malacological Union.—The 17th annual meeting will be at the Buffalo Museum of Science, Buffalo, New York, August 22, 23 and 24, 1951. The hotel headquarters will be Hotel Lenox, 140 North Street, and, because of a Moose convention in Buffalo the same week, rooms must be reserved before July 1. Reservations for the annual dinner, which will be held in Hotel Lenox, Wednesday evening, August 22, must be made before July 15.

The field trip will be of unusual interest. A chartered bus will leave Hotel Lenox at 9 A.M., crossing the Peace Bridge to Canada and stopping first at Falls View for a short time. Then to Niagara Glen where collecting will be possible at the foot of the gorge. Lunch at Niagara Glen Restaurant. Recrossing the river at Queenston the return trip will include a stop at Prospect Point, Niagara Falls, where collecting may be possible at the foot of the American Falls. A drive around Goat Island will be included. Bus is scheduled to arrive in Buffalo at 5 P.M. The cost will be $1.00 per person. In order to enter Canada, naturalized citizens must produce a naturalization certificate, and aliens must be provided with a Border Crossing Card which may be obtained at their nearest Immigration Office.

Make all reservations with Mrs. Margaret M. Teare, 681 Lafayette Avenue, Buffalo 22, New York.

PUBLICATIONS RECEIVED

Recent species of the prionodont pelecypod Cucullaea. By David Nicol. Jour. Washington Acad. Sci., 40: 338–345. 1950. —*Cucullaea labiata* (Solander) is the name used for the species commonly known as "*C. concamerata*" in collections. All living cucullaeas are considered to be forms of *C. labiata*, though several subspecies may be distinguishable. Eight figures illustrate various local forms, and the distribution is plotted on a map.—H. A. P.

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DEVOTED TO THE INTERESTS OF CONCHOLOGISTS

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CONTENTS

Conchological monuments in Japan. By *Alvin R. Cahn* 1

Some land and fresh-water mollusks from Pará State, Brazil. By *F. Haas* 4

The Polygyridae of Pittsylvania County, Virginia. By *Leslie Hubricht* 6

Maxwellia, genus novum of Muricidae. By *Joshua L. Baily, Jr.*... 9

Killing and preservation of bivalve larvae in fluids. By *Melbourne Romaine Carriker* 14

Chondropoma schaliei. By *H. Burrington Baker* 17

Distribution of the mollusks in a basic bog lake and its margins. By *Ralph W. Dexter* 19

The type of a species. By *H. Burrington Baker* 27

Hiatella Daudin versus *Saxicava* Bellevue. (Continued from April no.) By *Henry Dodge* 29

New subgenera of *Busycon* Roeding. By *E. Sydney Marks* 34

Notes and news 35

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CONTENTS

New fountain snails from Florida. By *H. A. Pilsbry* 37
Tethys (*Aplysia*) *willcoxi* in Rhode Island Waters. By *Donald J. Zinn* 40
Studies on mollusk populations. By *R. Stohler* 47
Holospira kriegeri, new species, from Tamaulipas. By *Robbert J. Drake* 51
Land snails from Clifty State Park and Versailles State Park, Indiana. By *Clinton J. Bushey* 54
Pseudosubulina, a genus new to the United States. By *H. A. Pilsbry* 55
Notes on land snails of Texas. By *H. A. Pilsbry* 56
Some new records for exotic slugs in the United States. By *C. Bruce Lee* 58
New Mexican and Panamic shells. By *Maxwell Smith* 60
Daniel Littlefield Emery. By *William G. Fargo* 61
Olof O. Nylander. By *Percy E. Raymond* 63
American Malacological Union: 16th annual meeting. By *Margaret C. Teskey* 65
Notes and news 67
Publications received 71

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CONTENTS

Interesting shells from the Delmarva Peninsula. By *Bernadine Barker Baker* 73
A clarification of some Central American Unionidae. By *Richard I. Johnson* 77
The family Juliidae. By *Arthur D. Howard* 84
Land snails from the Guadalupe Range, Texas. By *H. A. Pilsbry* and *E. P. Cheatum* 87
The preservation of slugs. By *Leslie Hubricht* 90
Some notes on Haliotis. By *Joshua L. Baily, Jr.* 91
A new subspecies of Succinea from Japan. By *Gordon K. MacMillan* 94
Additional notes on the foreign snails of Louisiana. By *Harold W. Harry* 96
The mollusks of Dauphin County, Pennsylvania. By *Robert A. Heilman* 100
Notes and news 101
Publications received 105

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CONTENTS

A new Caribbean mollusk. By *H. A. Pilsbry* and *A. A. Olsson* 109
New deep-water olivellas from Florida, with notes on the *O. jaspidea-nivea* complex. By *R. Tucker Abbott* 110
New marine mollusks from British West Indies and Florida Keys. By *Jeanne S. Schwengel* 116
New species of *Amnicola* and *Streptostyla*. By *H. A. Pilsbry* .. 119
A new *Vexillum* from Pliocene of St. Petersburg, Florida. By *William G. Fargo* 121
A new subspecies of *Ammonitella*. By *E. P. Chace* 122
Catalogue of Ancylidae of South and Central America and the West Indies, with description of a new species. By *Charles B. Wurtz* 123
European ballast shells in Staten Island, N. Y. By *Mathilde P. Weingartner* 132
Notes on some streptaxids. By *F. Haas* 133
Arnold Edward Ortmann as revealed by his letters. By *Henry van der Schalie* 134
Helicella caperata (Montagu) in Yorktown, Virginia. By *John Thornton Wood* 141
Notes and news 142
Publications received 144

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